Book 3009 Pg. 666 Parcel 84?

12913

KNOW ALL MEN BY THESE PRESENTS,

THAT I, Bertram J. Fairweather, of Portland, in the County of Cumberland and State of Maine, in consideration of Twenty-five Thousand ($25,000.00) Dollars paid by the City of Portland, a body politic and corporate, located in said County and State, the receipt whereof I do hereby acknowledge, do hereby give, grant, bargain, sell and convey unto the said City of Portland, its successors and assigns forever, a certain lot or parcel of land situated in said Portland on the westerly side of Westbrook Street and known as a part of the Broad Estate and bounded and described as follows: Beginning at a stake on the west side of said Westbrook Street North four and one-half degrees East (N 4½° 00' E) eight hundred six (806) feet from Abner Gould's corner; thence North seventy-four and one-half degrees West (N 74½° 00' W) two thousand three hundred (2,300) feet to a stake on line of land of Albert Chesley, and twenty-two (22) feet from said Chesley's and Edward Chapman's corner; thence North fifty-one and one-half degrees East (N 51½° 00' E) one thousand three hundred and forty-three (1,343) feet by said Chesley's land; thence North thirty degrees West (N 30° 00' W) one hundred sixteen and one-half (116½) feet by said Chesley's land; thence North sixty and one-half degrees East (N 60½° 00' E) six hundred ninety-six (696) feet by said Chesley's land; thence South thirty-one and one-half degrees East (S 31½° 00' E) one hundred eighty-nine and one-half (189½) feet by said Chesley's land; thence North sixty and three-fourths degrees East (N 60 3/4° 00' E) six hundred sixty (660) feet by said Chesley's land to the westerly side of said Westbrook Street; thence South four and one-half degrees East (S 4½° 00' E) eight hundred six (806) feet to the place of beginning; containing twenty-five acres and one hundred fifty-three and three-fourths (153 3/4) square rods as per plan of W. P. Jewett made April 16, 1874.

Excepting from the above described premises, however, a certain lot of land conveyed by Sarah D. Rich to one Sarah Nichols by deed dated July 11, 1910, and recorded in Cumberland County Registry of Deeds; Book 861, page 393.

Also excepting and reserving from the above described premises a certain other lot of land situated on the westerly side of Westbrook Street and bounded and described as follows: Beginning at the point of intersection of said westerly side of Westbrook Street with the northerly side line of a lot of land now or formerly belonging to one John H. Johnson; thence running northerly along said westerly side of Westbrook Street a distance of four hundred (400) feet to a point; thence westerly and at right angles to said Westbrook Street a distance of one hundred (100) feet to a point; thence southerly on a line parallel to said westerly side of Westbrook Street a distance of four hundred thirty-six (436) feet, more or less, to the northerly side line of said Johnson land; thence northeasterly along said northerly side line of said Johnson land a distance of one hundred six and fifty-seven hundredths (106.57) feet to said westerly side of Westbrook Street and point of beginning.

Also excepting and reserving from the above described premises that portion thereof which was included in the lot or parcel of land taken by the Municipal Officers of the City of Portland for the expansion of an Air Port or Landing Field as appears by eminent domain proceedings dated May 2, 1941 and recorded in said Registry of Deeds in Book 1634, page 492.

Excepting and reserving, however, to the Grantor, his heirs and assigns, a portion of said premises with the buildings thereon bounded and described as follows: Beginning at a point on the westerly side line of Westbrook Street, said point being distant 774.36 feet northerly along the said westerly side line of Westbrook Street from the northerly terminus of the discontinuance of said street by the County Commissioners as defined in Docket 1175, dated January, 1957, on file in the office of said County Commissioners, County Building, Portland, Maine, said point also being the northerly corner of land of the Norman Realty Holding Corporation; thence North eighty-two degrees forty-four minutes West (N 82° 44' W) by land of the Norman Realty Holding Corporation and at right angles to the said westerly side line of Westbrook Street a distance of 100.00 feet to a point; thence South seven degrees sixteen minutes West (S 7° 16' W) on a line parallel to and distant 100.00 feet westerly of the said westerly side line of Westbrook Street and at right angles to the last described course a distance of 100.00 feet to a point; thence North 82° 44' West through land of the Grantor as hereinabove described and at right angles to the last described course a distance of 470 feet, more or less, to land as conveyed to John A. and Lorena A. Knight by deed dated May 26,1955 and recorded in said Registry of Deeds in Book 2231, page 116; thence N 66° 35½' E by land of Knight a distance of 512.5 feet to a point; thence N 81° 52½' E by said land of Knight a distance of 134 feet,more or less, to the westerly side line of Westbrook Street; thence S 7° 16' W by the westerly side line of Westbrook Street a distance of 197 feet, more or less, to land of the said Norman Realty Holding Corporation and the point of beginning, containing 1.78 acres, more or less.

Also excepting and reserving to the Grantor, his heirs and assigns a right-of-way fifteen feet in width lying to the west of a line distant 100.00 feet westerly and parallel to the said westerly side line of Westbrook Street and to extend 225 feet to the south from the most southerly boundary line of the parcel above reserved to the Grantor within which a septic tank effluent drain may be maintained, repaired and replaced so long as said drain may be needed to serve the premises herein reserved to the Grantor.

Grantee, in further consideration of the conveyance to it of the land herein conveyed, covenants and agrees that should there be constructed, within a period of not more than ten years from the date hereof, a public airport access road crossing such land to a point on Congress Street, it will convey to the Grantor, his heirs and assigns,a right-of-way 20 feet in width extending from the land herein reserved to the Grantor in a location lying to the south of the division line between land of John A. and Lorena A. Knight and extending in a westerly direction by said division line to the easterly side line of said future airport access road. It is understood and agreed that such right-of-way when granted shall be for the purpose of travel only and for no other purpose and that no building, structure or other encumbrance of any nature shall be placed, erected, or maintained therein.

This conveyance is made subject to the right of way or easement granted by Isaac Fairweather to Portland Pipe Line Company by deed dated June 26, 1941 and recorded in said Registry of Deeds, in Book 1646, page 4.

Being the same premises devised to Bertram J. Fairweather and Teresa M. Boyle under the will of Isaac H. Fairweather, an abstract of which is recorded in the said Registry of Deeds in Book 1970, page 386. Reference is also made to deed from Teresa M. Boyle to Bertram J. Fairweather dated September 1, 1950 and recorded in said Registry of Deeds in Book 2015, page 405.

To have and to hold the aforegranted and bargained premises with all the privileges and appurtenances thereof, to the said City of Portland, its successors and assigns, to its and their use and behoof forever. And I do covenant with the said Grantee, its successors and assigns, that I am lawfully seized in fee of the premises, that they are free of all incumbrances; except as aforesaid, that I have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that I and my heirs shall and will WARRANT AND DEFEND the same to the said Grantee, its successors and assigns forever, against the lawful claims and demands of all persons.

IN WITNESS WHEREOF. I the said Bertram J. Fairweather, and Katherine L. Fairweather, wife of the said Bertram J. Fairweather, joining in this deed as Grantors, and relinquishing and conveying all right by descent and all other rights in the above described premises, have hereunto set our hands and seals this 30th day of August in the year of our Lord one thousand nine hundred and sixty-seven.

Signed, Sealed and Delivered
in the presence of

F. A. Johnson — Bertram J. Fairweather

Priscilla L. Meyer — Katherine L. Fairweather

STATE OF MAINE,
Cumberland, ss. August 30, 1967.

Personally appeared the above named Bertram J. Fairweather and acknowledged the foregoing instrument to be his free act and deed.

Before me,

Frederick A. Johnson
Justice of the Peace
~~Notary Public~~

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Parcel B-4

Also a certain lot or parcel of land with the buildings thereon, situated westerly of Westbrook Street in the City of Portland, Cumberland County and State of Maine. Designated Parcel B-4 as shown on the aforementioned Property Acquisition Plan, more particularly bounded and described as follows:

Beginning at a stake on the westerly sideline of Westbrook Street marking the most northerly corner of land of Bertram J. Fairweather, said stake being distant 971 feet, more or less, northerly along the said westerly sideline of Westbrook Street from the northerly terminus of the discontinuance of Westbrook Street by the County Commissioners as defined in Docket 1175, dated January 1957, on file in the office of the County Commissioners, Cumberland County, Portland, Maine; thence S 7°-16' W by the westerly sideline of Westbrook Street, 197 feet, more or less, to land of the Norman Realty Holding Corporation; thence N 82°-44' W by land of the Norman Realty Holding Corporation and at right angles to the said westerly sideline of Westbrook Street, a distance of 100.00 feet to a point; thence S 7°-16' W on a line parallel to and distant 100.00 feet westerly of the said westerly sideline of Westbrook Street and at right angles to the last described course; a distance of 436.00 feet, more or less, to a lot of land conveyed by Eleanor J. Nielsen to the City of Portland by deed, dated July 15, 1957, and recorded in Cumberland County Registry of Deeds in Book 2361, Page 436; thence S 76°-55½' W by land of the City of Portland; 1052.50 feet, more or less, to a point; thence by said City of Portland land N 84°-16½'W; 658.45 feet to a point in the Portland-South Portland boundary line and being also the most southerly corner of land of the said Fairweather; thence N 54°-39½' E by the said Portland-South Portland boundary line, a distance of 784.56 feet to land conveyed by Margaret E. Silver to John A. and Lorena A. Knight by deed, dated May 26, 1955, and recorded in Cumberland County Registry of Deeds in Book 2231, Page 116; thence S 28°-17' E by land of John A. and Lorena A. Knight; a distance of 147.00 feet, more or less, to a stake; thence northeasterly by said land of Knight a distance of 1106 feet, more or less, to a stake; thence northeasterly by land of said Knight, a distance of 134 feet to the point of beginning. Said courses being magnetic and of the year 1955, containing 15.5 acres, more or less.

Excepting and reserving from the above described parcel a certain pipe line easement now held by Portland Pipe Line Co.

(MENTED (1) WARRANTY CO.

-6-

And said Municipal Officers further having determined that said air rights and easements as hereinafter described are needed and suitable for the expansion of said Portland Municipal Airport did take perpetual

Section 4

FINANCIAL AND TECHNICAL ABILITY

Financial Ability:

The airport will be funding this project through a combination of passenger facility charges and revenue bonds. A summary of the Airport's financing strategy is presented in the December 21, 2000 draft Financing Strategy for the Portland International Jetport's Proposed Parking Garage, Rental Car Facilities, and Associated Roadways, enclosed at the end of this section.

Technical Ability:

The design and construction of the Phase I Parking Garage and associated site improvements is being completed under the direction of the city of Portland's Department of Waterfront and Transportation. The city's team of consultants hired for this project consists of the following firms.

Firm	Address	Services
Domench Hicks & Krockmalnic, Inc.	155 Massachusetts Avenue Boston, MA 02115	Project Management, Architectural Design
Rich and Associates	21800 West Ten Mile Rd. Southfield, MI 48075	Parking Structure Design
Dufresne-Henry, Inc.	22 Free Street Portland, ME 04101	Survey, Civil, Mechanical, Electrical, and Roadway Design, Construction Services
Gorrill Palmer	P. O. Box 1237 Gray, ME 04039	Traffic Engineering
Haley & Aldrich	500 Southborough Drive S. Portland, ME 04106	Geotechnical Engineering

This design team was chosen by the city following a Request for Proposals, and Interview process. The chosen team has the staff, expertise, and experience necessary for this type of project. The team has a full staff of architects, engineers, and technical support staff. Resumes of key staff members can be provided if requested.

Operational Ability:

After the facility is constructed the Portland International jetport will assume operation of the facility. The jetport staff has been responsible for operating the existing parking garage and surface parking lots through its parking management consultant, APCOA. They will continue to manage the overall parking operations for the jetport.

PB 100 YEARS

PB Aviation, Inc.
A Parsons Brinckerhoff Company

312 Elm Street
Suite 2500
Cincinnati, OH 45202-2720
(513) 639-2100
Fax: (513) 421-9657

MEMORANDUM

To: *Jeff Schultes*
Portland International Jetport

From: *PB Aviation, Inc.*

Date: *December 21, 2000*

Subject: ***FINANCING STRATEGY FOR THE PORTLAND INTERNATIONAL JETPORT'S PROPOSED PARKING GARAGE, RENTAL CAR FACILITIES, AND ASSOCIATED ROADWAYS***

This memo presents the financial strategy for the proposed parking garage, with rental car facilities and associated roadways at the Portland International Jetport (the Jetport). The methodology utilized to develop the financial analyses is presented below. The Jetport's projected financial information is presented for Fiscal Year (FY) 2002 through FY 2011. The financial projections are based primarily on a review of historical financial operations, discussions with Jetport staff, and estimated future aviation activity levels.

For presentation purposes, the remainder of this memo is organized under the following headings:

- Project Description
- Activity Projections
- Debt Service
- Expenses
- Nonairline Revenues
- Airline Revenues
- Cash Flow

1. PROJECT DESCRIPTION

The current parking facilities at the Jetport provide 1,350 parking spaces for Jetport patrons. Over the past two years, these facilities have not been sufficient to meet parking demand during non-holiday periods. It is common for departing passengers to be forced to park in areas, such as the grassy edges of the Jetport roadways, which are not technically considered parking facilities. As a result, the parking garage project originated from continuing demand for additional parking capacity at the Jetport.

The proposed project at the Jetport is a multi-level parking garage that will be connected to the terminal building via covered walkways. The parking garage will include rental car pick-up and return facilities and associated roadways. The garage is sized to meet the existing and future parking demand at the Jetport. The completion of this parking garage will increase available public parking spaces at the Jetport from 1,350 to 2,625. Construction for the garage is expected to begin early in 2001 with completion occurring by mid-2003. The projected project

costs for the parking garage are expected to be approximately $26 million. The roadways portion of this project is estimated to be approximately $1.3 million, which is anticipated to be financed with passenger facility charges. The remaining $24.7 million is anticipated to be financed with revenue bonds.

2. Activity Projections

Table 1 presents the activity projections for the Jetport from FY 2002 through FY 2011 for landed weight and enplanements. The landed weight at the Jetport remained relatively stable each year from FY 1997 to FY 2001. During this 4-year growth period, the landed weight decreased at an annual rate of 0.5 percent. This slight decrease in landed weight is due to a shift in the aircraft fleet mix at the Jetport. There was an increase in the proportion of flights that were being served by smaller aircraft. Total landed weight is estimated to be approximately 1.2 billion pounds in FY 2002 increasing to approximately 1.4 billion pounds in FY 2011,representing an annual compounded growth rate of approximately 1.3 percent during this period.

The Jetport experienced an increase in enplanements in every year from FY 1997 to FY 2001. During this 4-year growth period, the annual compounded growth in enplanements at the Jetport was 4.0 percent, compared to an annual compounded growth for the U.S. overall of 3.6 percent during the same period. Enplanements are estimated to be 712,900 in FY 2002 increasing to approximately 833,700 in FY 2011. This increase represents an annual compounded growth rate of 1.8 percent during this period, compared to 4.0 percent projected for the United States by the FAA during the same time period. Enplanement growth during the projection period is projected at a more conservative rate than that expected for the nation due to the uncertainty of the airline industry in the future.

3. Debt Service

It is assumed that debt, backed primarily by parking revenues, will be the initial funding source utilized by the Jetport to finance the project costs for the parking garage. For purposes of this analysis, it is assumed that a line of credit will be secured for one year to finance the initial cash flow needs for the parking garage. As construction begins and the project costs for the parking garage are more defined, long-term debt will be issued to repay the line of credit and finance the remainder of the garage.

Table 2 presents the projected debt service requirements of the Jetport for the parking garage. As shown in Table 2, debt service is approximately $1.2 million in FY 2003, increasing to $2.5 million in FY 2011. This analysis does not reflect the issuance of any additional debt for other capital projects during the projection period.

Salomon Smith Barney prepared debt service projections for this analysis based on project cost estimates developed by the Jetport and its consultants. A package containing details of Salomon Smith Barney's assumptions is provided as **Appendix A** to this report. The following provides a summary regarding the assumptions used in developing the debt service projections.

- The line of credit financing interest rate is assumed to be 6.5 percent.
- Bonds issued to repay the line of credit and finance the remainder of construction costs are 30-year final maturity fixed–rate bonds with a level debt service structure.
- The average coupon interest rate is approximately 6.64 percent.
- Issuance costs are approximately 2 percent of the total bond issue size. Both the issuance costs and the debt service reserve requirements are funded from bond proceeds.

4. EXPENSES

Total operation and maintenance (O&M) expenses include cost of operation for the Jetport, as well as indirect cost allocations from the City of Portland for administration, ARFF, and security. O&M expenses are classified within the expense categories of payroll and benefits, administrative services, contractual services, maintenance and repairs, supplies, utilities, insurance, and contributions. O&M expenses in each of the above categories are then assigned to the Jetport's cost centers, which include Terminal, Jetport Field, General Aviation Terminal, Administration, Police and Security, ARFF, Roadways, and Fringe and Indirect.

Table 3 presents O&M expenses FY 2001 through FY 2011. As shown in the table, O&M expenses are projected at approximately $6.4 million in FY 2001 and are projected to increase to approximately $13.1 million in FY 2011, reflecting an annual compounded growth rate of approximately 7.4 percent during this period. O&M Expense projection assumptions are discussed in greater detail as follows:

- The FY 2001 O&M expenses reflect the amounts presented in the FY 2001 operating budget for the City of Portland's Department of Transportation and Waterfront Facilities.
- FY 2001 expenses are used as the basis for the FY 2002 expense projections.
- Inflation was estimated for future O&M Expenses based on a review of historical growth trends. As a result, O&M Expenses in each of the categories above are estimated to increase annually at a rate of 4 percent.
- Parking expenses are projected to increase in FY 2003 as a result of the new parking garage being completed. The parking garage expenses were developed by using the parking expense analysis performed by the Jetport in 2000 and the estimated expenses contained in a parking study prepared for the Jetport by Walker Parking Consultants in 1999. Details of these calculations are contained in **Table 4**. As shown in the table, O&M expense line items were analyzed on an individual basis to determine the FY 2003 O&M expense projections for the new parking garage.

5. NONAIRLINE REVENUES

Table 5 presents nonairline revenues for the projection period FY 2001 through FY 2011. As shown in the table, nonairline revenues are projected to be approximately $5.9million in FY 2001 and are projected to increase to approximately $10.8 million in FY 2011 an annual compounded growth rate of approximately 6.2 percent during this period. The following is a summary of the assumptions used in developing the nonairline revenue projections for this analysis.

- The FY 2001 revenues reflect the amounts presented in the FY 2001 operating budget for the City of Portland's Department of Transportation and Waterfront Facilities.
- FY 2001 revenues are used as the basis for the FY 2002 revenue projections.
- Terminal Building concession revenues are projected to primarily increase in the future as a result of enplanement growth and inflation.
- As a result of the new parking garage, parking and rental car revenues are projected to increase in FY 2003. The projection assumptions regarding these revenue sources are discussed below.

- The increase in parking revenues is based upon a parking study prepared for the Jetport by Walker Parking Consultants in 1999. This study prepared gross parking revenue projections for a new parking facility with two rate structure alternatives. For this analysis, the rate structures were applied to the projected enplanements prepared by PB Aviation. Details of the two parking rate structure alternatives and parking revenue projections are presented in **Table 6**. The alternatives projected parking revenues based on average rates collected per enplanement. The Jetport administration expects that parking rate structure in the new garage will follow the Rate B analysis presented in Table 6. As a result, parking revenues are projected to be approximately $4.2 million in FY 2003 increasing to approximately $4.9 million in FY 2011 as a result of increases in enplanements.

- Beginning in FY 2003, additional rental car commissions are projected to come online. Based upon discussions with Jetport administration, the incremental amount of revenue is projected to be approximately $1 million. Increases in rental car revenues for the remainder of the projection period are based on enplanement growth and inflation.

- When the new garage is complete, ticket counters for rental car companies will be moved from their current location in the terminal building to the parking garage. As a result, ticket counter revenue for the parking garage is included in this analysis. It is assumed that there will be approximately 3,500 square feet of ticket counter space that will be leased to the rental car companies at $50 per square foot. As a result, ticket counter rentals are projected to be $175,000 in FY 2003. Increases in ticket counter rentals in the parking garage for the remainder of the projection period are increased as a result of inflation.

- Rental car operations will be located in the garage when it is complete. As a result, it is expected that parking fees collected from rental car companies will increase. It is assumed that the Jetport will collect approximately $50 per month for each of the 275 parking spaces occupied by the rental car companies. As a result, parking revenues from rental car companies are projected to be $165,000 in FY 2003. Increases in parking revenue from rental car companies for the remainder of the projection period are increased as a result of inflation.

6. Airline Revenues

Table 7 presents a summary of the Airline rates and charges and the Airline cost per enplanement for the projection period. The addition of the parking garage does not impact the Airline rates and charges. Increases in the Airline rates and charges and cost per enplanement during the projection period are primarily due to the impacts of inflation.

7. Cash Flow

Combining the O&M Expenses, debt service, revenues, and other requirements developed and presented earlier in this report, **Table 8** presents projected cash flow and debt service coverage calculations for the parking garage for FY 2002 through FY 2011. As shown in the table, net revenues for the parking garage are at least 1.25 times annual debt service for each of the years in the projection period. **Table 9** presents the projected cash flow for the Jetport. As shown in Table 9, the net revenues for the Jetport are at least 1.25 times annual debt service for each of the years in the projection period. On the basis of the assumptions and analysis presented in this memo, the Jetport's net revenues are adequate to meet a standard industry coverage requirement of 1.25 times.

8. Sensitivity Analysis

A sensitivity analysis was prepared to show the impacts of the new parking garage with a more conservative increase in enplanement levels. For the sensitivity analysis, enplanements for the projection period were increased at 0.5 percent. **Table 10** presents the projected cash flow and debt service coverage calculations for the Jetport for FY 2002 through FY 2011. As shown in the table, net revenues for the under this sensitivity analysis, are at least 1.25 times annual debt service for each of the years in the projection period.

H:\Clients\PWM (Portland, ME)\28767A Task 1 Strategic Funding\Correspondence\Memo Parking Garage Financial Strategy - Jeff Schultes.doc

TABLE 1
City of Portland, Aviation Department
Portland International Jetport
Strategic Funding Analysis
ACTIVITY
December 21, 2000

	Projected 2002	Projected 2003	Projected 2004	Projected 2005	Projected 2006	Projected 2007	Projected 2008	Projected 2009	Projected 2010	Projected 2011
Enplanements	712,900	723,600	738,300	756,100	772,800	787,700	801,300	813,100	824,000	833,700
Landed Weight	1,206,771	1,216,083	1,225,395	1,244,135	1,262,875	1,281,615	1,300,355	1,319,095	1,334,783	1,350,713

TABLE 2
City of Portland, Aviation Department
Portland International Jetport
Strategic Funding Analysis
DEBT SERVICE
December 21, 2000

	Projected 2002	Projected 2003	Projected 2004	Projected 2005	Projected 2006	Projected 2007	Projected 2008	Projected 2009	Projected 2010	Projected 2011
GENERAL OBLIGATION BONDS										
Terminal	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Jetport Field	0	0	0	0	0	0	0	0	0	0
General Aviation Terminal	0	0	0	0	0	0	0	0	0	0
Administration	0	0	0	0	0	0	0	0	0	0
Police & Security	0	0	0	0	0	0	0	0	0	0
ARFF	0	0	0	0	0	0	0	0	0	0
Roadways	0	0	0	0	0	0	0	0	0	0
Fringe & Indirect	268,608	256,798	245,333	224,495	211,038	200,724	189,414	178,596	0	0
Parking	0	0	0	0	0	0	0	0	0	0
TOTAL	$268,608	$256,798	$245,333	$224,495	$211,038	$200,724	$189,414	$178,596	$0	$0
PARKING GARAGE DEBT SERVICE										
Terminal	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Jetport Field	0	0	0	0	0	0	0	0	0	0
General Aviation Terminal	0	0	0	0	0	0	0	0	0	0
Administration	0	0	0	0	0	0	0	0	0	0
Police & Security	0	0	0	0	0	0	0	0	0	0
ARFF	0	0	0	0	0	0	0	0	0	0
Roadways	0	0	0	0	0	0	0	0	0	0
Fringe & Indirect	0	0	0	0	0	0	0	0	0	0
Parking	301,365	1,179,008	2,477,880	2,480,352	2,476,008	2,479,675	2,476,177	2,475,482	2,472,410	2,471,774
TOTAL	$301,365	$1,179,008	$2,477,880	$2,480,352	$2,476,008	$2,479,675	$2,476,177	$2,475,482	$2,472,410	$2,471,774
TOTAL DEBT SERVICE										
Terminal	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Jetport Field	0	0	0	0	0	0	0	0	0	0
General Aviation Terminal	0	0	0	0	0	0	0	0	0	0
Administration	0	0	0	0	0	0	0	0	0	0
Police & Security	0	0	0	0	0	0	0	0	0	0
ARFF	0	0	0	0	0	0	0	0	0	0
Roadways	0	0	0	0	0	0	0	0	0	0
Fringe & Indirect	268,608	256,798	245,333	224,495	211,038	200,724	189,414	178,596	0	0
Parking	301,365	1,179,008	2,477,880	2,480,352	2,476,008	2,479,675	2,476,177	2,475,482	2,472,410	2,471,774
TOTAL	$569,973	$1,435,806	$2,723,213	$2,704,847	$2,687,046	$2,680,399	$2,665,591	$2,654,078	$2,472,410	$2,471,774

TABLE 3
City of Portland, Aviation Department
Portland International Jetport
Strategic Funding Analysis
EXPENSES
December 21, 2000

	Budget 2001	Projected 2002	Projected 2003	Projected 2004	Projected 2005	Projected 2006	Projected 2007	Projected 2008	Projected 2009	Projected 2010	Projected 2011
Summary by Line Item											
Payroll & Benefits	$2,073,615	$2,156,560	$2,701,522	$3,190,501	$3,318,121	$3,450,845	$3,588,879	$3,732,434	$3,881,732	$4,037,001	$4,198,481
Administrative Services	389,026	404,587	420,771	437,601	455,105	473,310	492,242	511,932	532,409	553,705	575,854
Contractual Services	1,223,650	1,272,596	1,499,973	2,219,272	2,308,042	2,400,364	2,496,379	2,596,234	2,700,083	2,808,087	2,920,410
Maintenance & Repairs	356,000	370,240	587,371	734,413	763,789	794,341	826,114	859,159	893,525	929,266	966,437
Rentals	292,300	303,992	316,152	339,027	352,588	366,692	381,360	396,614	412,479	428,978	446,137
Supplies	425,320	442,333	495,845	630,451	655,670	681,896	709,172	737,539	767,041	797,722	829,631
Utilities	546,350	568,204	844,544	1,159,277	1,205,648	1,253,874	1,304,029	1,356,190	1,410,438	1,466,855	1,525,530
Insurance	65,869	68,504	92,594	96,298	100,150	104,156	108,322	112,655	117,161	121,847	126,721
Contributions	1,008,000	1,048,320	1,090,253	1,133,863	1,179,217	1,226,386	1,275,442	1,326,459	1,379,518	1,434,698	1,492,086
TOTAL	$6,380,130	$6,635,335	$8,049,024	$9,940,702	$10,338,331	$10,751,864	$11,181,938	$11,629,216	$12,094,385	$12,578,160	$13,081,286
Summary by Cost Center											
Terminal	$2,178,987	$2,266,146	$2,356,792	$4,020,781	$4,181,612	$4,348,877	$4,522,832	$4,703,745	$4,891,895	$5,087,571	$5,291,074
Jetport Field	1,034,699	1,076,087	1,119,130	1,163,896	1,210,451	1,258,870	1,309,224	1,361,593	1,416,057	1,472,699	1,531,607
General Aviation Terminal	46,450	48,308	50,240	52,250	54,340	56,514	58,774	61,125	63,570	66,113	68,757
Administration	1,404,348	1,460,522	1,518,943	1,579,701	1,642,889	1,708,604	1,776,948	1,848,026	1,921,947	1,998,825	2,078,778
Police & Security	367,595	382,299	397,591	413,494	430,034	447,236	465,125	483,730	503,079	523,202	544,130
ARFF	1,243,051	1,292,773	1,344,484	1,398,263	1,454,194	1,512,362	1,572,856	1,635,770	1,701,201	1,769,249	1,840,019
Roadways	105,000	109,200	113,568	118,111	122,835	127,749	132,858	138,173	143,700	149,448	155,426
Fringe & Indirect	0	0	0	0	0	0	0	0	0	0	0
Parking	0	0	1,148,276	1,194,207	1,241,975	1,291,654	1,343,320	1,397,053	1,452,935	1,511,052	1,571,495
TOTAL	$6,380,130	$6,635,335	$8,049,024	$9,940,702	$10,338,331	$10,751,864	$11,181,938	$11,629,216	$12,094,385	$12,578,160	$13,081,286

TABLE 4
City of Portland, Aviation Department
Portland International Jetport
Strategic Funding Analysis
PARKING EXPENSE ANALYSIS
December 21, 2000

Expense Estimates	CITY PARKING GARAGE EXPENSES 1,000 Spaces (2000$)	1,000 Spaces (2003$)	Cost Per Space	# of Spaces 2600 (2003$)	Walker Study (2003$)	Expenses Used in Analysis
Payroll & Benefits	$318,093	$357,811	$357.81	$930,310	$458,700	$458,700
Administrative Services	0	0	0.00	0	0	0
Contractual Services [1]	47,714	53,672	53.67	139,547	213,400	176,473
Cleaning	0	0	0.00	0	0	0
Maintenance & Repairs	96,505	108,555	108.56	282,243	122,400	202,322
Rentals	0	0	0.00	0	0	0
Supplies	14,750	16,592	16.59	43,139	28,500	35,819
Utilities	0	0	0.00	0	0	0
Electricity	80,975	91,086	91.09	236,823	270,400	253,612
Insurance	0	0	0.00	0	42,700	21,350
Contributions	0	0	0.00	0	0	0
Subtotal	$558,037	$627,716	$627.72	$1,632,061	$1,136,100	$1,148,276

[1] Includes management fee.

TABLE 5
City of Portland, Aviation Department
Portland International Jetport
Strategic Funding Analysis
NONAIRLINE REVENUES
December 21, 2000

	Budget 2001	Projected 2002	Projected 2003	Projected 2004	Projected 2005	Projected 2006	Projected 2007	Projected 2008	Projected 2009	Projected 2010	Projected 2011
Terminal Concessions											
Restaurant	$307,229	$318,285	$329,523	$342,942	$358,234	$373,469	$388,284	$402,887	$416,997	$431,038	$444,835
Airport News	150,154	155,558	161,050	167,608	175,082	182,528	189,769	196,906	203,802	210,664	217,407
Advertising	99,789	103,380	107,030	111,389	116,356	121,304	126,116	130,859	135,442	140,003	144,484
Other	24,427	25,306	26,200	27,267	28,483	29,694	30,872	32,033	33,155	34,271	35,368
	$581,800	$602,529	$623,804	$649,206	$678,155	$706,996	$735,040	$762,686	$789,395	$815,977	$842,094
Parking	$3,000,000	$3,107,956	$4,247,932	$4,334,229	$4,438,725	$4,536,763	$4,624,235	$4,704,074	$4,773,347	$4,837,336	$4,894,280
Rental Car											
Commissions	$2,186,000	$2,264,664	$3,344,627	$3,480,825	$3,636,041	$3,790,677	$3,941,039	$4,089,264	$4,232,473	$4,374,995	$4,515,027
Ticket Counters - Terminal	39,925	41,522	0	0	0	0	0	0	0	0	0
Ticket Counters - Garage	0	0	175,000	178,500	182,070	185,711	189,426	193,214	197,078	201,020	205,040
Parking	26,640	27,706	165,000	171,600	178,464	185,603	193,027	200,748	208,778	217,129	225,814
Service Facility	34,000	35,360	36,774	38,245	39,775	41,366	43,021	44,742	46,531	48,393	50,328
	$2,286,565	$2,369,251	$3,721,402	$3,869,171	$4,036,350	$4,203,357	$4,366,512	$4,527,968	$4,684,860	$4,841,537	$4,996,210
Miscellaneous	$17,680	$17,680	$17,680	$17,680	$17,680	$17,680	$17,680	$17,680	$17,680	$17,680	$17,680
TOTAL NONAIRLINE REVENUES	**$5,885,845**	**$6,097,416**	**$8,610,818**	**$8,870,286**	**$9,170,910**	**$9,464,797**	**$9,743,467**	**$10,012,407**	**$10,265,282**	**$10,512,529**	**$10,750,264**

TABLE 6
City of Portland, Aviation Department
Portland International Jetport
Strategic Funding Analysis
PARKING REVENUE ANALYSIS
December 21, 2000

	Rate per Enplanement	Projected 2003	Projected 2004	Projected 2005	Projected 2006	Projected 2007	Projected 2008	Projected 2009	Projected 2010	Projected 2011
Enplanements		723,600	738,300	756,100	772,800	787,700	801,300	813,100	824,000	833,700
RATE A										
Hourly	$1.29	$932,001	$950,935	$973,861	$995,371	$1,014,562	$1,032,079	$1,047,278	$1,061,317	$1,073,811
Daily	$3.32	2,400,647	2,449,416	2,508,470	2,563,875	2,613,308	2,658,428	2,697,576	2,733,738	2,765,919
Weekly	$0.82	592,575	604,613	619,190	632,866	645,068	656,206	665,869	674,795	682,739
Total Revenue	$5.42	$3,925,223	$4,004,964	$4,101,522	$4,192,112	$4,272,938	$4,346,713	$4,410,723	$4,469,850	$4,522,469
RATE B										
Hourly	$1.35	$980,265	$1,000,179	$1,024,293	$1,046,916	$1,067,101	$1,085,525	$1,101,511	$1,116,277	$1,129,418
Daily	$3.63	2,623,272	2,676,564	2,741,095	2,801,637	2,855,654	2,904,958	2,947,737	2,987,253	3,022,418
Weekly	$0.89	644,395	657,486	673,338	688,210	701,479	713,590	724,099	733,806	742,444
Total Revenue	$5.87	$4,247,932	$4,334,229	$4,438,725	$4,536,763	$4,624,235	$4,704,074	$4,773,347	$4,837,336	$4,894,280

TABLE 7
City of Portland, Aviation Department
Portland International Jetport
Strategic Funding Analysis
RATE SUMMARY
December 21, 2000

	Projected 2002	Projected 2003	Projected 2004	Projected 2005	Projected 2006	Projected 2007	Projected 2008	Projected 2009	Projected 2010	Projected 2011
Terminal Rental Rates										
Phase I Space	$35.11	$35.47	$31.32	$32.67	$34.05	$35.43	$36.87	$38.17	$39.71	$41.31
Phase II Space/Airline Holdroom	$36.14	$37.02	$31.92	$33.15	$34.48	$35.87	$37.30	$38.58	$40.09	$41.50
Phase II Space/Airline Other	$25.65	$26.11	$21.16	$21.95	$22.84	$23.76	$24.70	$25.48	$26.46	$27.33
Phase II Space/Public	$36.14	$37.02	$31.92	$33.15	$34.48	$35.87	$37.30	$38.58	$40.09	$41.50
Landing Fee	$1.45	$1.50	$1.53	$1.57	$1.59	$1.63	$1.67	$1.70	$1.74	$1.79
Airline Cost Per Enplanement	$5.17	$5.25	$5.67	$5.76	$5.84	$5.96	$6.09	$6.20	$6.36	$6.51

TABLE 8
City of Portland, Aviation Department
Portland International Jetport
Strategic Funding Analysis
PARKING COST CENTER CASH FLOW
December 21, 2000

	Projected 2002	Projected 2003	Projected 2004	Projected 2005	Projected 2006	Projected 2007	Projected 2008	Projected 2009	Projected 2010	Projected 2011
REVENUES										
Parking	$3,107,956	$4,247,932	$4,334,229	$4,438,725	$4,536,763	$4,624,235	$4,704,074	$4,773,347	$4,837,336	$4,894,280
Rental Car	2,369,251	3,721,402	3,669,171	4,036,350	4,203,357	4,366,512	4,527,968	4,684,860	4,841,537	4,996,210
TOTAL REVENUES	$5,477,207	$7,969,334	$8,203,400	$8,475,075	$8,740,121	$8,990,746	$9,232,042	$9,458,207	$9,678,872	$9,890,490
M&O Expense	$0	$1,148,276	$1,194,207	$1,241,975	$1,291,654	$1,343,320	$1,397,053	$1,452,935	$1,511,052	$1,571,495
NET REVENUES	$5,477,207	$6,821,058	$7,009,193	$7,233,100	$7,448,467	$7,647,426	$7,834,989	$8,005,272	$8,167,820	$8,318,995
Capital Outlays under $10,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Capital Costs	0	0	0	0	0	0	0	0	0	0
Debt Service	301,365	1,179,008	2,477,880	2,480,352	2,476,008	2,479,675	2,476,177	2,475,482	2,472,410	2,471,774
ADJUSTED NET REVENUES	$5,175,842	$5,642,050	$4,531,314	$4,752,748	$4,972,458	$5,167,752	$5,358,812	$5,529,790	$5,695,410	$5,847,221
COVERAGE CALCULATION										
Net Revenues	$5,477,207	$6,821,058	$7,009,193	$7,233,100	$7,448,467	$7,647,426	$7,834,989	$8,005,272	$8,167,820	$8,318,995
Debt Service	$301,365	$1,179,008	$2,477,880	$2,480,352	$2,476,008	$2,479,675	$2,476,177	$2,475,482	$2,472,410	$2,471,774
COVERAGE	**18.17**	**5.79**	**2.83**	**2.92**	**3.01**	**3.08**	**3.16**	**3.23**	**3.30**	**3.37**

TABLE 9
City of Portland, Aviation Department
Portland International Jetport
Strategic Funding Analysis
TOTAL CASH FLOW
December 21, 2000

	Projected 2002	Projected 2003	Projected 2004	Projected 2005	Projected 2006	Projected 2007	Projected 2008	Projected 2009	Projected 2010	Projected 2011
REVENUES										
Terminal Rentals	$1,944,835	$1,982,289	$2,320,949	$2,411,358	$2,509,134	$2,610,350	$2,714,541	$2,806,339	$2,916,255	$3,019,569
Landing Fees	1,743,784	1,818,044	1,868,727	1,947,071	2,001,657	2,082,624	2,165,091	2,235,866	2,322,522	2,411,023
Other Operating	6,449,456	8,971,231	9,239,293	9,548,738	9,851,680	10,139,646	10,418,131	10,680,806	10,938,116	11,186,186
Non-Operating	590,409	603,089	616,150	629,602	643,459	657,730	672,431	687,572	703,167	719,230
TOTAL REVENUES	$10,728,483	$13,374,653	$14,045,119	$14,536,769	$15,005,930	$15,490,350	$15,970,194	$16,410,582	$16,880,060	$17,336,009
M&O Expense	$6,635,335	$8,049,024	$9,940,702	$10,338,331	$10,751,864	$11,181,938	$11,629,216	$12,094,385	$12,578,160	$13,081,286
NET REVENUES	$4,093,148	$5,325,628	$4,104,416	$4,198,439	$4,254,066	$4,308,412	$4,340,978	$4,316,198	$4,301,900	$4,254,722
Capital Outlays under $10,000	$34,528	$35,909	$37,345	$38,839	$40,393	$42,009	$43,689	$45,436	$47,254	$49,144
Capital Costs	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000
Debt Service	569,973	1,435,806	2,723,213	2,704,847	2,687,046	2,680,399	2,665,591	2,654,078	2,472,410	2,471,774
ADJUSTED NET REVENUES	$3,238,647	$3,603,913	$1,093,858	$1,204,752	$1,276,627	$1,336,005	$1,381,698	$1,366,683	$1,532,237	$1,483,804
COVERAGE CALCULATION										
Net Revenues	$4,093,148	$5,325,628	$4,104,416	$4,198,439	$4,254,066	$4,308,412	$4,340,978	$4,316,198	$4,301,900	$4,254,722
Net Debt Service	$569,973	$1,435,806	$2,723,213	$2,704,847	$2,687,046	$2,680,399	$2,665,591	$2,654,078	$2,472,410	$2,471,774
COVERAGE	**7.18**	**3.71**	**1.51**	**1.55**	**1.58**	**1.61**	**1.63**	**1.63**	**1.74**	**1.72**

TABLE 10
City of Portland, Aviation Department
Portland International Jetport
Strategic Funding Analysis
TOTAL CASH FLOW
December 21, 2000

	Projected 2002	Projected 2003	Projected 2004	Projected 2005	Projected 2006	Projected 2007	Projected 2008	Projected 2009	Projected 2010	Projected 2011
REVENUES										
Terminal Rentals	$1,944,835	$1,982,289	$2,320,949	$2,411,358	$2,509,134	$2,610,350	$2,714,541	$2,806,339	$2,916,255	$3,019,569
Landing Fees	1,743,784	1,818,044	1,868,727	1,947,071	2,001,657	2,082,624	2,165,091	2,235,866	2,322,522	2,411,023
Other Operating	6,449,456	8,900,069	9,040,137	9,183,412	9,329,978	9,479,921	9,633,329	9,790,295	9,950,911	10,115,273
Non-Operating	590,409	603,089	616,150	629,602	643,459	657,730	672,431	687,572	703,167	719,230
TOTAL REVENUES	$10,728,483	$13,303,491	$13,845,963	$14,171,443	$14,484,227	$14,830,625	$15,185,392	$15,520,071	$15,892,854	$16,265,096
M&O Expense	$6,635,335	$8,049,024	$9,940,702	$10,338,331	$10,751,864	$11,181,938	$11,629,216	$12,094,385	$12,578,160	$13,081,286
NET REVENUES	$4,093,148	$5,254,467	$3,905,261	$3,833,113	$3,732,364	$3,648,687	$3,556,176	$3,425,687	$3,314,695	$3,183,810
Capital Outlays under $10,000	$34,528	$35,909	$37,345	$38,839	$40,393	$42,009	$43,689	$45,436	$47,254	$49,144
Capital Costs	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000
Debt Service	569,973	1,435,806	2,723,213	2,704,847	2,687,046	2,680,399	2,665,591	2,654,078	2,472,410	2,471,774
ADJUSTED NET REVENUES	$3,238,647	$3,532,752	$894,703	$839,426	$754,924	$676,280	$596,896	$476,172	$545,031	$412,891
COVERAGE CALCULATION										
Net Revenues	$4,093,148	$5,254,467	$3,905,261	$3,833,113	$3,732,364	$3,648,687	$3,556,176	$3,425,687	$3,314,695	$3,183,810
Net Debt Service	$569,973	$1,435,806	$2,723,213	$2,704,847	$2,687,046	$2,680,399	$2,665,591	$2,654,078	$2,472,410	$2,471,774
COVERAGE	**7.18**	**3.66**	**1.43**	**1.42**	**1.39**	**1.36**	**1.33**	**1.29**	**1.34**	**1.29**

Section 5

EXISTING SOIL CONDITIONS

Overview

In April 2000, Haley & Aldrich, Inc performed a subsurface investigation for the proposed Parking Garage and Master Plan at the Portland International Jetport. As part of the subsurface exploration, test borings were drilled and test pits were excavated to evaluate subsurface conditions and water levels at the project site location and during the times indicated on the logs.

Existing Soil Review

The results of the subsurface investigation are included herein in the geotechnical report prepared by Haley & Aldrich, Inc. The subsurface investigation found no contaminated soils on the project site.

Attachments

Geotechnical Report on Proposed Parking Garage and Master Plan by Haley & Aldrich, Inc. for Domenech Hicks & Krockmalnic Architects, dated July 2000.

REPORT ON
PROPOSED PARKING GARAGE AND MASTER PLAN
PORTLAND INTERNATIONAL JETPORT
PORTLAND, MAINE

by

Haley & Aldrich, Inc.
South Portland, Maine

for

Domenech Hicks & Krockmalnic Architects
Boston, Massachusetts

File No. 26123-000
July 2000

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HALEY & ALDRICH

14 July 2000
File No. 26123-000

Domenech Hicks & Krockmalnic Architects
155 Massachusetts Avenue
Boston, Massachusetts 02115

Attention: Mr. Mickey Krockmalnic

Subject: Proposed Parking Garage and Master Plan
Portland International Jetport
Portland, Maine

Ladies and Gentlemen:

This report presents the results of our subsurface investigation for the proposed Parking Garage and Master Plan at the Portland International Jetport in Portland, Maine. Recommendations for foundation type, design criteria and related information will be provided under separate cover when the project requirements have been established. This work was performed in accordance with our proposal dated 19 April 2000.

INTRODUCTION

The project site is located at the Portland International Jetport, as shown on Figure 1, Project Locus. The project will include Master Planning for realignment of roadways and facilities and design of new structured parking (parking garage). The parking garage will be designed and constructed in several phases to an ultimate build-out. The first phase will include a six-level structure for approximately 1,200 cars, to the north of the existing three-level garage. The lowest level will be below grade at approximately El. 49.5. Phase II and III will occur to the south and west of Phase I, respectively. It is anticipated that Phase II will occupy most of the existing garage. Parking will eventually fill in most of the area within the re-designed loop roadway. Elevations in this report are in feet and referenced to National Adjusted Datum, 1983.

Readily available subsurface information provided by the Jetport consists of two borings along the present roadway on the north side of the existing garage and borings from the recent terminal expansion.

SUBSURFACE EXPLORATIONS

Maine Test Borings, Inc., (MTB) of Brewer, Maine, drilled a total of 39 test borings, B1 through B38 and B7A, at the site between 22 May and 13 June 2000. In addition, W.H. Lavigne, Inc. of Westbrook, Maine excavated 6 test pits, TP1 through TP6, on 6 June 2000. Exploration locations are shown on Figure 2, Site and Subsurface Exploration Plan.

The borings were drilled to total depths varying from 4.6 to 22.0 ft. below ground surface. Soil samples were typically obtained at 5-ft. intervals in the borings. Standard Penetration Resistance (N) was measured at each sample interval in accordance with ASTM test designation D1586. All borings, except B2, B16, B21 through B26, and B34, were drilled with hollow-stem augers. Borings B2, B16, B21 through B26 and B34, were drilled with 3 in. diameter casings. Groundwater observation wells were installed in completed borings B2, B16 and B34. Haley & Aldrich monitored the test borings and summarized subsurface conditions in Table I, Summary of Subsurface Conditions. Logs of borings, prepared by MTB, are included in Appendix A. Observation well installation reports and groundwater monitoring reports, prepared by Haley & Aldrich, are included in Appendix B.

Test pits were excavated to total depths below ground surface ranging from 5.3 to 7.0 ft. Test pits TP4, TP5 and TP6 were backfilled with the excavated material. Test pits TP1, TP2, and TP3 were excavated next to the existing garage to expose foundations and were backfilled with structural fill compacted in layers and topped with a minimum of 3 in. of bituminous concrete. Haley & Aldrich monitored the test pits and prepared the logs included in Appendix C. Table I provides a summary of the test pits.

Dufresne-Henry, Inc. determined locations and ground surface elevations at explorations by survey methods.

The boring and test pit logs and related information depict subsurface conditions and water levels encountered at the locations and during the times indicated on the logs. Subsurface conditions at other locations may differ from those encountered in the borings and test pits. The passage of time may result in a change in groundwater conditions at the exploration locations.

SUBSURFACE CONDITIONS

The explorations encountered five principal soil units: Topsoil, fill, marine deposit, glacial till, and weathered bedrock. Encountered thickness and generalized descriptions of the soil units are presented below in order of increasing depth below ground surface.

Topsoil – Topsoil generally consists of dark brown loamy SILT, with roots. Encountered thickness ranged from 0.5 to 1.0 ft.

Fill - Fill varies from medium dense to dense, brown, sandy GRAVEL to gravelly coarse to fine SAND, trace to little silt. Concrete particles were noted in boring B10, and a 0.7-ft. concrete layer was encountered in boring B8. Encountered thickness varied from 0.3 to 11.0 ft.
Marine Deposits - Marine deposits generally consist of medium stiff to stiff, gray-brown to gray silty CLAY; to loose to dense, light brown coarse to fine SAND, trace fine gravel; to very loose gray silty medium to fine SAND, some clay. Encountered thickness varied from 1.0 to more than 20.0 ft.

Glacial Till – Glacial Till generally consists of loose to very dense, brown to gray clayey SILT; to gravelly, coarse to fine SAND, variable quantities of gravel, silt and clay and cobbles and boulders; some samples were described as having occasional to frequent silt or clay laminae to layers. Encountered thickness varied from 0.4 to more than 20.0 ft.

Weathered Rock – Weathered rock was encountered in boring B2 and generally consists of dark gray to black SHALE, based on auger cuttings. Borings B1, B4, B5, B21, B33 and B37 encountered refusal to boring penetration, which is probably bedrock or weathered rock. Based on depths to refusal encountered in the explorations, bedrock will not likely be encountered in foundation construction except near the northwest corner of the existing garage where shallower depths to refusal were encountered.

Water levels encountered in the explorations ranged from approximately 4.0 ft. to 20.1 ft. below ground surface. Water levels measured in the observation wells between 30 May 2000 and 6 July 2000 varied from El. 56.1 to El. 65.9. Groundwater levels are expected to fluctuate with season, precipitation, temperature and construction activities in the area. Therefore, groundwater levels during and following construction will vary from those encountered in the explorations.

PRELIMINARY FOUNDATION CONSIDERATIONS

Based on the subsurface conditions disclosed by the explorations, we anticipate that the garage structure may be supported on shallow foundations bearing in the marine and/or glacial till deposits. Test pits excavated at the existing garage confirmed that the structure is supported on spread footings. It may be necessary to underpin the existing foundations to accommodate the lowest level construction of the new garage at El. 49.5.

Groundwater will be encountered at El. 49.5 and below for foundation construction. It will be necessary to provide for permanent lowering of the groundwater below the new garage in addition to construction dewatering. We anticipate that perimeter foundation drains and underslab drains will be required at the lowest floor level.

LIMITATIONS OF RECOMMENDATIONS

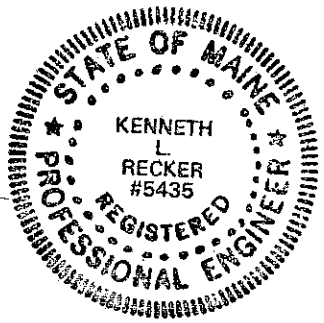
This report has been prepared for specific application to the proposed garage and master plan in accordance with generally accepted soil and foundation engineering practices. The recommendations presented herein are based in part upon the data from the referenced explorations. The nature and extent of variations between the explorations may not become evident until construction.

It has been a pleasure to work with you on this project. Please do not hesitate to contact us if you have questions or need more information.

Sincerely yours,
HALEY & ALDRICH, INC.

Brian K. Lawrence
Engineer

Kenneth L. Recker, P.E.
Vice President



Enclosures

Table I	- Summary of Subsurface Conditions
Figure 1	- Project Locus
Figure 2	- Site and Subsurface Exploration Plan
Appendix A	- Logs of Test Borings
Appendix B	- Observation Well Installation and Groundwater Monitoring Reports
Appendix C	- Logs of Test Pits

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TABLE I
SUMMARY OF SUBSURFACE CONDITIONS
PARKING GARAGE AND MASTER PLAN
PORTLAND INTERNATIONAL JETPORT
PORTLAND, MAINE

Explor. No.	Ground Surface El. (ft.)	Explor. Depth (ft.)	Depth to Water (ft.)	Strata Thickness (ft.)			
				Fill/ Topsoil	Marine Deposit	Glacial Till	Weathered Rock
B1	62.7	18.4	12.0	2.0	8.0	8.4	0.0*
B2(OW)	62.5	15.0	--	11.1	--	--	3.9*
B3	62.9	22.0	--	2.0	10.5	9.5*	--
B4	62.9	21.1	12.4	2.0	9.5	9.6	0.0*
B5	61.6	15.0	14.0	2.0	--	13.0	0.0*
B6	62.6	22.0	20.1	2.0	--	20.0*	--
B7	63.4	8.5	--	8.5*	--	--	--
B7A	63.4	22.0	--	2.0	8.0	12.0*	--
B8	63.9	22.0	14.2	8.0	--	14.0*	--
B9	64.0	22.0	11.4	5.0	--	17.0*	--
B10	64.3	22.0	19.4	6.5	3.0	12.5*	--
B11	67.1	22.0	17.1	4.0	1.5	16.5*	--
B12	63.3	22.0	4.2	2.0	4.0	16.0*	--
B13	63.2	22.0	9.5	2.0	1.0	19.0*	--
B14	63.7	22.0	11.3	2.0	9.0	11.0*	--
B15	62.9	22.0	5.8	5.0	4.0	13.0*	--
B16(OW)	62.2	22.0	--	4.0	7.0	11.0*	--
B17	62.1	22.0	5.9	0.5	4.0	17.5*	--
B18	63.2	22.0	--	0.5	--	21.5*	--
B19	64.0	22.0	20.1	2.0	10.0	10.0*	--
B20	66.5	22.0	11.8	2.0	3.0	17.0*	--
B21	62.6	4.6	4.0	4.6	--	--	0.0*
B22	62.4	13.5	--	5.0	6.0	2.5*	--
B23	61.4	10.0	4.6	4.5	--	5.5*	--
B24	61.5	11.5	7.9	6.5	--	5.0*	--
B25	62.1	12.4	--	4.0	2.5	5.9*	--
B26	62.2	10.0	5.6	9.5	--	0.5*	--
B27	66.8	22.0	--	2.0	--	20.0*	--
B28	65.8	22.0	19.0	5.0	--	17.0*	--
B29	70.3	22.0	--	4.0	3.0	15.0*	--
B30	70.3	22.0	17.8	3.0	9.0	10.0*	--
B31	69.3	22.0	--	2.0	2.5	17.5*	--
B32	70.6	22.0	--	2.0	20.0*	--	--
B33	70.7	11.8	--	2.5	9.0	0.3	0.0*
B34(OW)	71.3	22.0	--	2.0	20.0*	--	--

HALEY & ALDRICH

TABLE I
SUMMARY OF SUBSURFACE CONDITIONS
PARKING GARAGE AND MASTER PLAN
PORTLAND INTERNATIONAL JETPORT
PORTLAND, MAINE

Explor. No.	Ground Surface El. (ft.)	Explor. Depth (ft.)	Depth to Water (ft.)	Strata Thickness (ft.)			
				Fill/ Topsoil	Marine Deposit	Glacial Till	Weathered Rock
B35	60.8	22.0	12.8	2.0	3.0	17.0*	--
B36	62.8	22.0	18.5	2.0	6.0	14.0*	--
B37	66.6	21.6	4.2	2.0	6.5	13.1	0.0*
B38	69.0	22.0	--	2.0	--	20.0*	--
TP1	62.6	5.5	5.0	2.3	3.2*	--	--
TP2	62.9	7.0	6.5	1.6	5.4*	--	--
TP3	61.5	5.3	--	1.7	3.6*	--	--
TP4	77.5	5.5	--	1.0	--	4.5*	--
TP5	77.8	5.5	--	0.5	--	5.0*	--
TP6	72.3	5.5	5.0	1.0	4.5*	--	--

Notes:
1. -- Not encountered in exploration.
2. * Depth of penetration into stratum in exploration (does not necessarily represent full depth of deposit).
3. Elevations referenced to National Geodetic Vertical Datum (NGVD).

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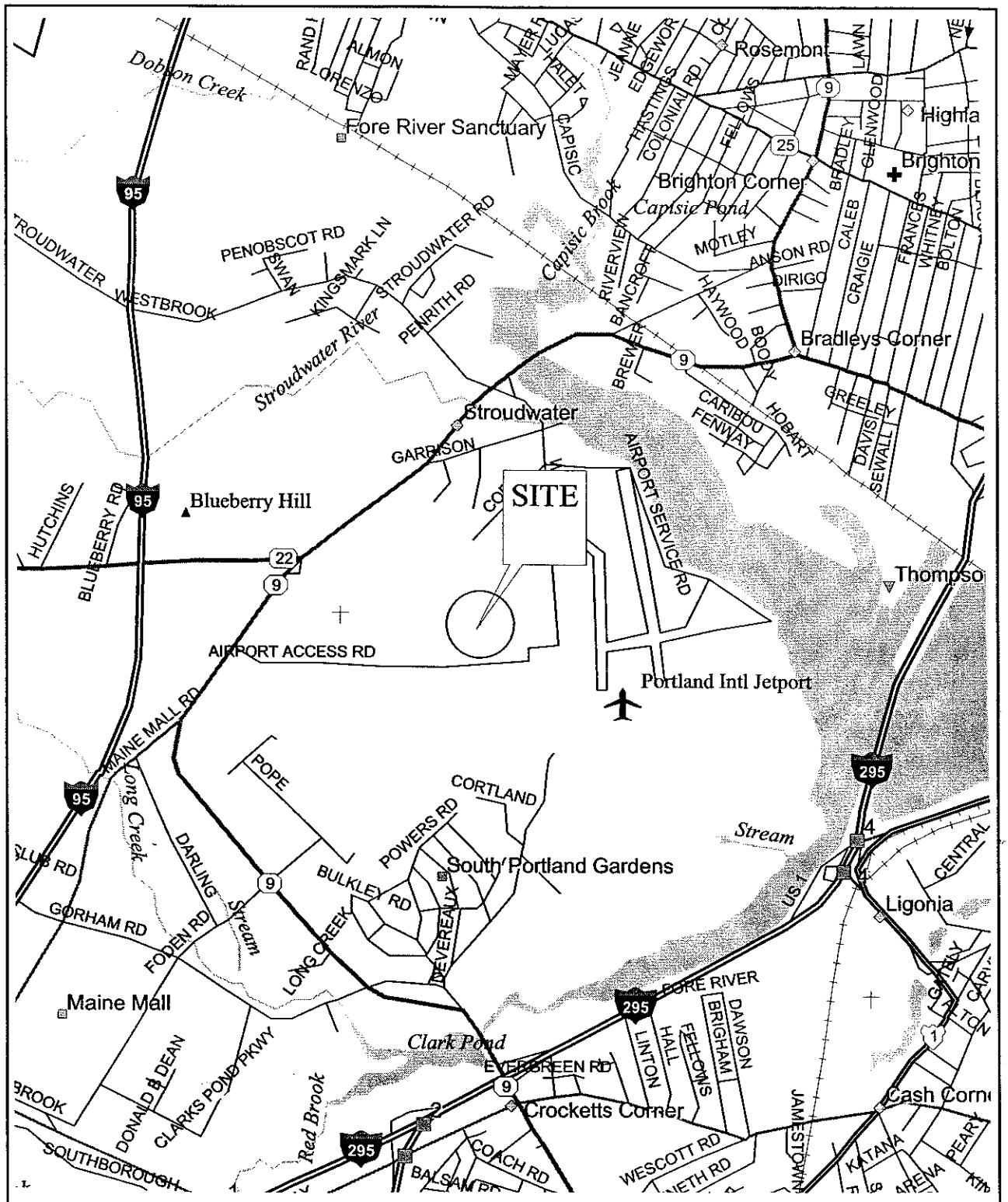
HALEY & ALDRICH



SITE COORDINATES: N43°38'54",W70°18'48"

"MAP FROM DELORME'S STREET ATLAS USA, FREEPORT, MAINE"

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

PARKING GARAGE AND MASTER PLAN
PORTLAND INTERNATIONAL JETPORT
PORTLAND, MAINE

PROJECT LOCUS

APPROX. SCALE: 1:25,000

JULY 2000

FILE NO. 26123-000

FIGURE 1

Section 6

SOLID WASTE DISPOSAL

Construction Site Preparation and Excavation Activities

During site preparation activities, it may be necessary to dispose of excavated bituminous pavement that is not ground and reclaimed on-site. The Contractor will be required to dispose of any excess material at an appropriate facility handling this type of material.

Construction Activities:

The Contractor will be required to dispose of construction debris at a licensed solid waste facility.

Should contaminated soil be encountered, the Contractor will be required to submit a disposal plan for review and approval. All contaminated soils will be disposed of at a Maine Department of Environmental Protection (MDEP) approved site. No contamination was identified during the April 2000 subsurface investigation conducted by Haley & Aldrich, Inc.

Operational Solid Waste:

Solid waste generated by the new parking garage will consist of miscellaneous paper waste from the lower level car rental facilities and bathrooms for the general public. Solid waste from the new parking garage will be collected in storage containers within the parking garage. Regular pickups will be made by solid waste haulers. The city currently contracts with Waste Management of Portland to collect their solid waste. In addition, Waste Management also handles recycling of paper waste generated at the Jetport as well. Waste Management will continue to be utilized for the new parking garage.

Waste Management is required to dispose of the operational waste at a licensed solid waste facility.

Section 7

WATER SUPPLY

Overview

The Portland International Jetport has public water supplied by the Portland Water District. An existing 12-inch water main is located along the existing loop road on the North side of the existing parking structure. This main will be relocated to follow the alignment of the future terminal access road, cutting through the existing surface parking lot located to the west of the existing parking structure. The Portland Water District has jurisdiction over the water main, and they perform water main design services with in-house personnel. In addition, there is an existing 12-inch watermain that is located along Westbrook Street and runs along the side of the existing garage. Preliminary coordination with the Portland Water District has taken place to establish the water main relocation alignment. Additional coordination is in progress.

The proposed parking garage will be served by the existing 12-inch watermain located along the new loop road on the east side of the garage. Water is required for the bathroom facilities and sprinkler system located inside the car rental facility. The parking facility will contain a dry hydrant system.

Utility Review

The Portland Water District has been contacted regarding projected water usage requirements for the proposed parking garage, service connections to the watermain and request for ability to serve the new facility. A letter from the Portland Water District has not yet been received and will be forwarded to the city of Portland Planning Department upon receipt.

Attachments

Letter from Dufresne-Henry to the Portland Water District, dated December 13, 2000.

Dufresne-Henry

22 Free Street . Portland, Maine 04101-3900 . Tel: 207.775.3211 . Fax: 207.775.6434 . E-mail: dhmaine@agate.net

December 13, 2000

FILE COPY

Mr. Jay Hewitt
Portland Water District
225 Douglass Street
P.O. Box 3553
Portland, ME 04104-3553

Subject: **Portland International Jetport**
Planning Board Review

Dear Mr. Hewitt:

Dufresne-Henry is part of a design team that is responsible for the design development of a new 1,600 +/- car parking garage at the Portland International Jetport. This project is anticipated to start construction in the spring of 2001. The project is aimed at relieving parking congestion for the next 5 to 10 year period. We have enclosed a project location map and a construction phasing plan for your information.

The proposed project will include the following components:

- A new loop road that will circle the new garage and create an infield area.
- Relocation of numerous utilities, including primary electrical and telephone service to the facility.
- A recessed level of the garage to be used for rental car operations.
- An overpass structure that will carry traffic on the loop road over the ramp for drop off and returns for the rental car operation.
- Several retaining walls achieve grade separation.

The proposed project is being submitted to the City of Portland Planning Board for approval. The City of Portland's Water District's notification and review of the proposed project is required as part of the Planning Board Submittal. Please review the enclosed information and confirm with us in writing whether or not your organization has any concerns associated with the proposed project.

Thank you for your assistance. Please contact us if additional information is needed to make your assessment.

Sincerely yours,
DUFRESNE-HENRY
Debbie L. Violette

Debbie L. Violette
Staff Engineer

Enc.: (1) Location Map
(1) Construction Phasing Plan

cc: Paul Bradbury, PWM
Mickey Krockmalnic, DHK
Jeff Preble, Dufresne-Henry

Section 8

WASTEWASTER TREATMENT

Overview

The Portland International Jetport discharges its wastewater to the city of Portland's wastewater treatment facility. The existing sanitary sewer service will be disrupted during construction of the first phase of the parking garage project. Currently, wastewater is pumped from the existing terminal building via a 4-inch force main to an existing manhole in the vicinity of the Southwest corner of the existing parking garage. In addition, wastewater from the Belly Freight building is pumped via a 2-inch force main to this existing manhole. From this manhole wastewater flows by gravity through an 8-inch sewer that extends under the existing parking garage and out to the intersection of the existing loop road and Westbrook Street. From the intersection, wastewater flows by gravity to the East. Wastewater also flows from Westbrook Street to the existing sewers at the intersection. Another 8-inch gravity sewer is located along the loop road north of the existing parking garage that flows into the common manhole at the intersection of the existing loop road and Westbrook Street. All of these sewers will be impacted by the proposed parking garage.

Given the phasing and layout of the new parking structure, it is expected that improvements will be designed so as not to conflict with future phases of the parking garage. The existing 4-inch force main will be re-routed along to follow along the future terminal access road, cutting through the existing surface parking lot located West of the existing parking garage where it will tie into a new manhole at the intersection of the existing airport access road and the proposed loop road. From this location, new gravity sewers will be installed along the proposed loop road to Westbrook Street where the sewer will be connected to the existing gravity sewer in the vicinity of the Northeast Air Facility. An evaluation of the existing pump station capacity to determine that the existing pumps must be upgraded to pump against the additional head created by lengthening the force main. The Jetport will complete this work prior to construction of the proposed project. The existing 2-inch force main will not require replacing in this area as the Belly Freight building is expected to be relocated to the new access road prior to construction of the proposed project.

Utility Review

The city of Portland has been contacted regarding the projected impacts to the existing sanitary sewer service, service connections, and wastewater flow requirements. A letter from the city of Portland has not yet been received and will be forwarded to the city of Portland Planning Department upon receipt. Preliminary coordination has taken place to establish the gravity sewer relocation alignment.

Attachments

Letter from Dufresne-Henry to the city of Portland, dated December 13, 2000.

Dufresne-Henry

22 Free Street . Portland, Maine 04101-3900 . Tel: 207.775.3211 . Fax: 207.775.6434 . E-mail: dhmaine@agate.net

December 13, 2000

Ms. Cathy Staples
City of Portland
55 Portland Street
Portland, ME 04101

Subject: **Portland International Jetport**
Planning Board Review

Dear Ms. Staples:

Dufresne-Henry is part of a design team that is responsible for the design development of a new 1,600 +/- car parking garage at the Portland International Jetport. This project is anticipated to start construction in the spring of 2001. The project is aimed at relieving parking congestion for the next 5 to 10 year period. We have enclosed a project location map and a construction phasing plan for your information.

The proposed project will include the following components:

- A new loop road that will circle the new garage and create an infield area.
- Relocation of numerous utilities, including primary electrical and telephone service to the facility.
- A recessed level of the garage to be used for rental car operations.
- An overpass structure that will carry traffic on the loop road over the ramp for drop off and returns for the rental car operation.
- Several retaining walls achieve grade separation.

The proposed project is being submitted to the City of Portland Planning Board for approval. The City of Portland's notification and review of the proposed project is required as part of the Planning Board Submittal. Please review the enclosed information and confirm with us in writing whether or not your organization has any concerns associated with the proposed project.

Thank you for your assistance. Please contact us if additional information is needed to make your assessment.

Sincerely yours,
DUFRESNE-HENRY

Debbie L. Violette

Debbie L. Violette
Staff Engineer

Enc.: (1) Location Map
(1) Construction Phasing Plan

cc: Paul Bradbury, PWM
Mickey Krockmalnic, DHK
Jeff Preble, Dufresne-Henry

Section 9

PARKING STUDY

Overview

Prior to the design of Phase I Improvements for the proposed parking garage for the Portland International Jetport, a Parking Master Plan was completed September 2000. A summary of that Master Plan is presented below.

PARKING MASTER PLAN

Growth at the Portland International Jetport has seen a rise in enplanements and boardings such that the airport's parking capacity needs to be increased in order to accommodate the new load. The City of Portland and PWM want to address this issue at a master plan level in order to assure that potential future growth will also be taken into consideration when further increase in parking needs arise. Future plans for the airport include a terminal expansion, a baggage claim area expansion, the relocation of the Belly Freight facility, and a new intermodal bus transfer facility.

The *Parking Master Plan*, which is based on the existing airport master plan, incorporates all the parking needs of the airport in phases, with an eye towards satisfying the pedestrian user needs, as well as minimizing the impacts upon the neighboring residential community.

The goals of the *Parking Master Plan* are:

- to assure that all the airport parking needs are addressed in the most land use-efficient way;
- to optimize the car rental operation;
- to improve the pick-up operations in the area adjacent to the baggage claim area, as well as taxi, private/public bus, vans, and limousine operations in the same area;
- to move cars and people with maximum of efficiency and safety on the airport territory, in an esthetically pleasing environment;
- to ensure the best opportunities for increasing parking revenues for PWM;
- to mitigate the impact on environmentally-sensitive areas, and
- to minimize the visual impact on abutters.

In an effort to get a better understanding of exactly how many parking spaces are presently needed, and how many will be needed in the future, the City had hired Walker Parking Consultants to produce a conceptual needs study for short and long-term range parking requirements. The study determined an immediate need for a parking garage with approximately 1200 cars. The construction of this structure will represent **Phase I** of the *Parking Master Plan* and this structure is scheduled to be completed in the year 2002.

The *Parking Master Plan* further incorporates two additional phases: **Phase II**, which will extend the Phase I garage onto the site presently occupied by the existing parking structure in front of the terminal, and **Phase III**, which will satisfy the parking needs for a period of 20 years, estimated at 5,000 – 5,500 parking spaces.

Section 9

PARKING STUDY

During the construction period of Phase I Parking Garage, temporary parking must be made available, and the *Parking Master Plan* indicates where it will be located.

In order to accommodate the new parking structures a new loop road will be constructed together with the Phase I Parking Garage; immediately north of this loop road a new parking lot, reserved for employees, will be built.

The *Parking Master Plan* also addresses the needs of the entire car rental operation at Portland International Jetport, as well as the taxi, bus and limousine operation.

FUNCTIONAL PARKING GARAGE DESIGN AND LAYOUT

Design Criteria

The design criteria used in the *Parking Master Plan* and garage layout resulted from a combination of the request for proposal documents (inclusive of the Walker Parking Consultants conceptual report mentioned above) and design standards established by this design team for parking structures at other airports.

The design criteria were meant to ensure user acceptance, convenience, and efficient traffic flow:

- A 9 ft. by 18 ft. parking stall dimension was established based upon the design team's experience at other airports; although a smaller parking stall would result in a more efficient structure, patrons in an airport parking structure frequently require additional room to handle baggage and passengers.

- A typical floor-to-floor height of 11.5 ft. was established which will improve signage visibility and user comfort on the large floors that will result in the final build out of the structure; a 13.5 ft. floor-to-floor height was established for the car rental level, as requested by rental car companies representatives.

- Due to the large peak volumes of traffic that occur in an airport operation, an express ramp solution was determined to best meet the goals established above; also, large flat floors are desirable in airport parking structure for user orientation as well as for safety and security.

User Groups

In establishing a design solution for the parking structure the design team had to consider all of the user groups who would be utilizing the facility. For the purposes of the master planning effort, three distinct user groups were considered: short-term parkers, long-term parkers, and rental car patrons. The demand numbers indicated in the conceptual report had different categories of parkers including hourly, daily, weekly, employee, and rental. This *Parking Master Plan* equates short-term parking with the concept report's hourly parking; similarly, this *Parking Master Plan*'s long-term parking includes all other groups with the exception of the rental

parking. In the final design phases these subcategories of long-term parking will have to be analyzed to determine if special operational controls will be necessary, or if defined areas will be required within the structure.

Ramping

Based upon the criteria established of an express ramp to handle the traffic volumes, the design team considered two different types of express ramps: a semi express ramp and a helical spiral ramp. Both of these ramping systems would handle the volume of traffic in each of the different phases of development. The spiral helical ramp consists of two intertwined ramps that ascend in a counter clockwise rotation. Each ramp climbs one level for each half revolution. This allows traffic to enter or exit the separate ramps from each level at diametrically opposite sides. The helical spiral ramp has an overall outside diameter of approximately 100 feet and an overall inside diameter of approximately 58 feet. The actual drive path for vehicles on the ramp will be 15 feet. These dimensions are somewhat more generous then the industry standards, however, most helical spiral ramps do not flatten out as they pass by each floor and consequently the floor slabs are generally warped to make the transition onto and off of the ramp. In the Portland Jetport Garage case the design team's goal was to achieve a structure with maximum user comfort, so a transitional flat area in the spiral ramp was provided at each location where it crosses a floor. This subsequently slightly increased the overall diameter of the spiral ramp.

Note: The semi express ramp considered (and ultimately not selected) would have been a straight run ramp of approximately 108 feet in length. The drive path was for two-way traffic and the overall ramp width was the same as the module width. The semi express ramp occupies a portion of a normal parking module; however, since the slopes are generally greater than six percent, no parking can occur or on either side of the two-way traffic drive aisle. Transitional slopes would have been provided at both the top and bottom of semi express ramps, to provide vertical curves, so that vehicles do not bottom out.

PHASE I PARKING GARAGE

The Phase I Parking Garage will be sited to the north of the existing parking garage structure, and immediately adjacent to it. This phase of the design will displace the Avis facility to a different site on the airport grounds. The garage will be a five-story structure, with one story being below grade and four stories above grade. This structure will have six parking levels (car rental level, grade level, and levels 3, 4, 5 and 6), the last of which will be roof parking. The lower (below grade) level of the garage will house all of the "ready and return" cars belonging to the rental car companies. At this location there will be a new Car Rental Facility, where the four car rental companies (Hertz, Avis, Budget, and National) will relocate from their present location inside the airport terminal (Alamo will continue to operate in the same manner and at the same location as in the present). The remaining five parking levels will become the long term parking for the airport, while the existing parking structure will continue to serve as a combination of short and long-term parking. Circulation inside the garage will be via a double spiral helix, which will project partially out from the northern garage façade.

Section 9

PARKING STUDY

The below grade rental car level will be serviced by three downward ramps: one for the renting public who returns the cars after looping in front of the terminal, a second one for the renting public exiting with the rental cars directly onto the loop road, and one used exclusively by the rental car service personnel, who will take out the returned cars for cleaning and fueling to remote facilities, and will return the ready cars for rental.

The Phase I Parking Garage will feature two elevators (in one bank) and two stairs. One stair and the elevator bank will connect all parking garage levels as well as the Car Rental Facility.

The Phase I Parking Garage will communicate with the existing 3-story parking structure (which has 610 parking spaces) via short ramps at the grade level and at the roof level of the latter. The surface lot will be redesigned to include new entrances and a new toll plaza. Entrance/exit to/from the Phase I Parking Garage will be through the surface lot, as well as a direct entry located after passing the terminal drop off lane.

One or more temporary parking lots, necessary to accommodate the parking spaces relocated because of construction, will also be provided.

As part of the Phase I Parking Garage, an enlarged surface lot will operate as long-term parking. It will feature a new exit plaza through which all cars will exit (with the exception of the rental cars that will use a dedicated customer exit ramp from the car rental level directly onto the loop road). Overall, the total surface parking capacity in this phase will be 1,090 cars (inclusive of the Hertz car rental spaces), compared with the equivalent present total surface parking capacity of 1,067 cars on the project site (inclusive of all car rental on site). Both these totals exclude an addition to the present employee parking lot of approximately 60 cars, expected to be completed in the year 2000. (Note: No off-site parking is included in the above numbers.)

Thus, the overall gain in parking spaces (surface and garage) in Phase I Parking Garage will be approximately 1,503 cars over the existing conditions.

Operations

The inside-the-loop public parking facility comprised of the Phase I Parking Garage, the existing 3-story parking structure and the expanded surface lot will operate as follows:

There will be three entrances into the parking facility:

- a first entrance with two driving lanes into the long-term lot from the bent in the access road; this entrance will use long-term parking rates.

- a second entrance with two lanes dedicated to short-term parking and two lanes dedicated to long-term parking, form the roadway in front of the terminal building; the first of these two pairs will use ticket dispensers with short-term parking rates, while the second pair will use long-term parking rates.

- a third entrance, directly into the garage will be available on the East side of the Phase I Parking Garage for those patrons that need to drop-off persons or luggage in front of the terminal before proceeding to parking the car; this entrance will use only long-term parking rates.

Short-term parking will be accommodated only at the ground level of the existing parking structure and will be accessed through the two driving lanes mentioned above. A no-pay, free-exit gate at the exit from this short-term parking level will count, together with the entrance gates, the number of available parking spaces in the short-term parking operation. When full capacity is reached a lighted sign will indicate to parkers that there are no short-term parking spots available and the ticket dispensing machines will automatically stop dispensing tickets. When the demand for short-term parking increases, a portion of the ground level of the new Phase I Parking Garage, which will be connected with a ramp to the ground level of the existing parking structure, could be used to increase the short-term parking capacity.

Long-term parking will be accommodated on the other two levels of the existing parking structure, in the entire above-grade new Phase I Parking Garage and on the surface lot. It will be accessed via the three entrances as described above, with two pairs of two driving lanes, one from the access road and one from existing road in front of the terminal, and separately, from the direct entrance into the Phase I Parking Garage.

All exit from the entire public parking facility will be through the toll plaza, where customers will pay based on the fare structure of the ticket collected at the entrance (short or long-term).

Rental Car Operations

The rental car area is divided into four distinct operations:

- rental car returns
- rental car service
- rental car ready areas
- rental car management and operations

Each of these four distinct areas has unique operational characteristics that affect the layout and design of this parking structure.

Rental car returns occur after a patron has finished with his rental car and is returning to the airport for air travel. There are two most common types of operations that occur on rental car returns depending upon the preference of the individual company or airport. The first type of operation is where the returning patron parks his rental car in a designated area for a specific company; in this case individual parking spaces are provided for the returning patron. The second type of operation is where the returning patron pulls forward into a queue line of vehicles already returned; these vehicles stack up in several rows from front to back. In both cases the returned vehicles are then ready to proceed to the service area. To get to the rental car return area

in the below-grade of Phase I Parking Garage an exterior ramp was provided on the East side of the structure. This ramp will only allow one-way traffic down to the below grade level.

The rental car service area is the next operation in the process. Rental car jockeys are utilized to transport the returned vehicles to an area either within the parking structure or off-site for fueling, servicing, and cleaning. In the case of the Portland Jetport Parking Garage the PWM representatives, as well as representatives from the individual rental car agencies indicated a preference for off-site servicing. In order to accomplish off-site servicing the rental car jockeys need to exit the below-grade level of the parking structure and transport a vehicle in need of service to the service area and return with a vehicle that has already been serviced. This entire operation should also not impede the normal traffic flow of returning or departing patrons from the rental car area or the normal vehicular traffic coming to the airport. To accomplish this goal, an exterior ramp is provided to the below-grade level of Phase I Parking Garage on the north side of the loop road for departing and returning rental car jockeys; this ramp will offer two-way movement exclusively for rental car jockey traffic.

The rental car ready area for each company would typically have parked vehicles in a normal parking stall. A patron would pick up a rented vehicle and exit the rental car area. In Phase I Parking Garage this is accomplished through the normal spiral ramping system on the North side of the garage. At the grade level a separate exit is provided for rental car patrons to directly access the loop road.

Rental car management and operations will be housed in a new Car Rental Facility that will be located on the East side of the Phase I Parking Garage, and which will house waiting areas for patrons, counter areas, office spaces for four rental car companies and service areas (washrooms, mechanical spaces, etc.)

Section 10

TRAFFIC ANALYSIS

Overview

The new loop road will function, as in the present, as a thoroughfare with a one-way counterclockwise pattern from a point immediately south of the International Parkway & Jetport Boulevard intersection.

Airport patrons will approach the terminal from a northwesterly direction and will be offered the following options:

- drop off or pick-up in front of the airport terminal;
- enter the parking facility (through the surface lot in Phases I and II Parking Garage, or directly in the garage in both Phase I and III Parking Garage);
- pick-up in the area of the (expanded) baggage claim area;
- return cars going down the ramp to the car rental level;
- ability to enter Westbrook Street and drive in a northerly direction;
- the western end of the new loop road will offer drivers two options: either to engage themselves on the two-way airport exit road (with a possibility of diverting to the Embassy Suites Hotel), or to return on the loop circuit (i.e. for pick-up in front of the terminal after exiting the garage).

Note: A separate entrance on the down-ramp to the rental car level is reserved exclusively for car rental personnel, returning the cleaned and fueled cars to that level.

When driving on the loop road, drivers will encounter cars entering the one-way system from the following directions:

- cars, taxis and buses entering the loop road from the separate baggage claim area loop;
- cars entering the loop road from Westbrook Street;
- cars entering the loop road from the service ramp of the car rental operation (cars being taken out to be cleaned and refueled);
- rented cars entering the loop road from the customer exit ramp of the rental car level;
- cars exiting the toll plaza of the entire parking operation;
- cars exiting the employee parking lot.

Traffic Analysis Review

The Maine Department of Transportation Traffic Division has been contacted regarding the projected impact on traffic for the Portland International Jetport proposed parking garage. A letter from the Maine Department of Transportation Traffic Division has concluded that the "Portland Jetport does not need a Traffic Movement Permit," for the proposed project.

Section 10

TRAFFIC ANALYSIS

Attachments

Letter from the Maine Department of Transportation Traffic Division to Gorrill-Palmer Consulting Engineers, Inc., dated October 24, 2000.

Letter from Gorrill-Palmer Consulting Engineers, Inc. to the Maine Department of Transportation Traffic Division, dated August 24, 2000.

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
16 STATE HOUSE STATION
AUGUSTA, MAINE
04333-0016

ANGUS S. KING, JR.
GOVERNOR

JOHN G. MELROSE
COMMISSIONER

October 24, 2000

Thomas L. Gorrill, P.E., P.T.O.E.
P.O. Box 1237
26 Main Street
Gray, ME 04039

RECEIVED
OCT 27 2000
BY:

RE: Proposed Parking Garage - Portland Jetport

Dear Tom:

The Department is in receipt of your letter dated August 24, 2000 in which you ask whether or not the proposed parking facility at the Portland Jetport requires a Traffic Movement Permit. It is my feeling that the Portland Jetport does not need a Traffic Movement Permit to construct a 1,480 space parking garage and an additional 23 surface parking spaces. Although a permit is not needed for the structure, if the Portland Jetport intends to increase its enplanements then a Traffic Movement Permit might possibly be needed. I would ask that you inform your client that any potential increase in enplanements should be reported to the Scarborough Division Office for review.

I apologize for any delay in getting back to you on this matter. if you have any further questions feel free to contact me at 287-3775.

Sincerely,

Stephen Landry P.E.

Stephen Landry, P.E.
Assistant State Traffic Engineer

150
Corr. Out

GP Gorrill-Palmer Consulting Engineers, Inc.
Traffic and Civil Engineering Services

PO Box 1237
26 Main St.
Gray, ME 04039

207-657-6910
FAX: 207-657-6912
E-Mail:gpcei@maine.rr.com

August 24, 2000

Mr. Dean Lessard, P.E.
Division Traffic Engineer
MDOT Division 6
P.O. Box 1940
Portland, ME 04101

Re: Proposed Parking Garage
Portland Jetport

Dear Dean:

The Portland Jetport is planning to construct a 1,480-space parking garage adjacent to the existing garage directly north of the main Jetport terminal, and increase surface parking by 23 spaces. The proposed construction of this garage, along with several roadway improvements planned at the Jetport comprises Phase I of the parking and roadway improvement plan for the Jetport. A color graphic depicting the garage and roadway improvements can be found enclosed with this letter. As the current parking capacity at the Jetport is 1,677 cars, the addition of the proposed garage (Phase 1) will bring to total parking capacity at the garage to 3,180 cars.

The proposed garage is anticipated to relieve a current parking shortage at the Jetport. Field observations indicate that during peak use periods at the Jetport, vehicles are parking throughout the Jetport and outside many of the designated parking areas. This situation poses many safety and circulation problems at the Jetport as well as decreased customer satisfaction. Therefore, the garage is not expected to generate new traffic, as it is not proposed in conjunction with any additional facilities such as additional gates, a larger terminal, or other Jetport expansions.

In summary, it is the opinion of Gorrill-Palmer Consulting Engineers, Inc. that a traffic permit is not required as part of the permitting process for the construction of this garage. However, it is our policy to notify MDOT of any significant construction. We would appreciate a response to this letter within two weeks in order to determine the permitting workload.

Please contact our office if you have any further questions regarding this matter.

Sincerely,

Gorrill-Palmer Consulting Engineers, Inc.

Thomas L. Gorrill, P.E., P.T.O.E.
President

Enclosure

Copy: Bruce Ibarguen, MDOT
Andrea Clemon, Domenech, Hicks, & Krockmalnic
Larry Ash, City of Portland

JJB/jb/JN150/Lessard8-16-00.doc

Section 11

SITE LIGHTING

Overview

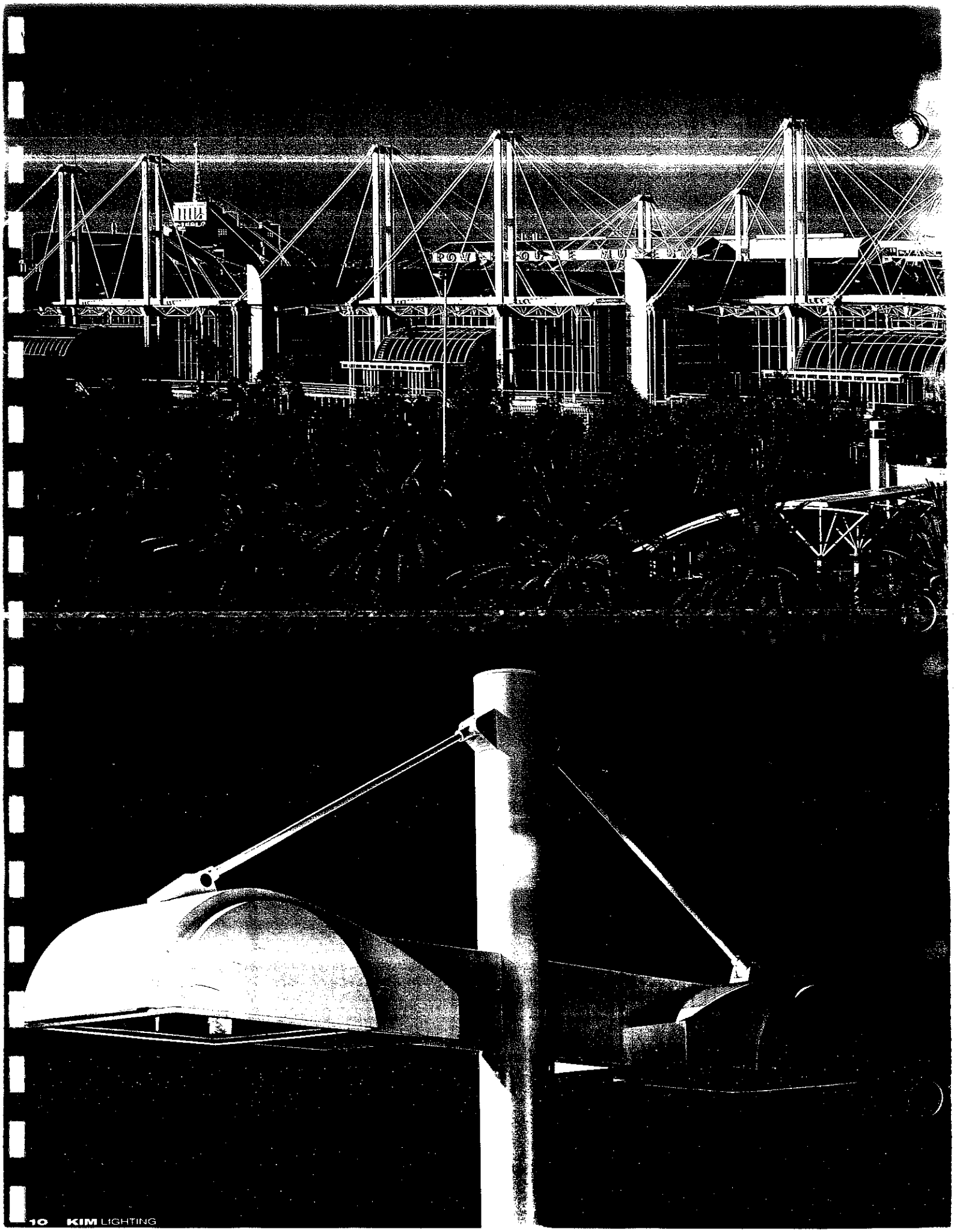
Existing lighting within the surface parking lots will be affected by construction of the new garage, loop road, and associated site work. The new lighting scheme is being designed to minimize impacts to adjacent areas.

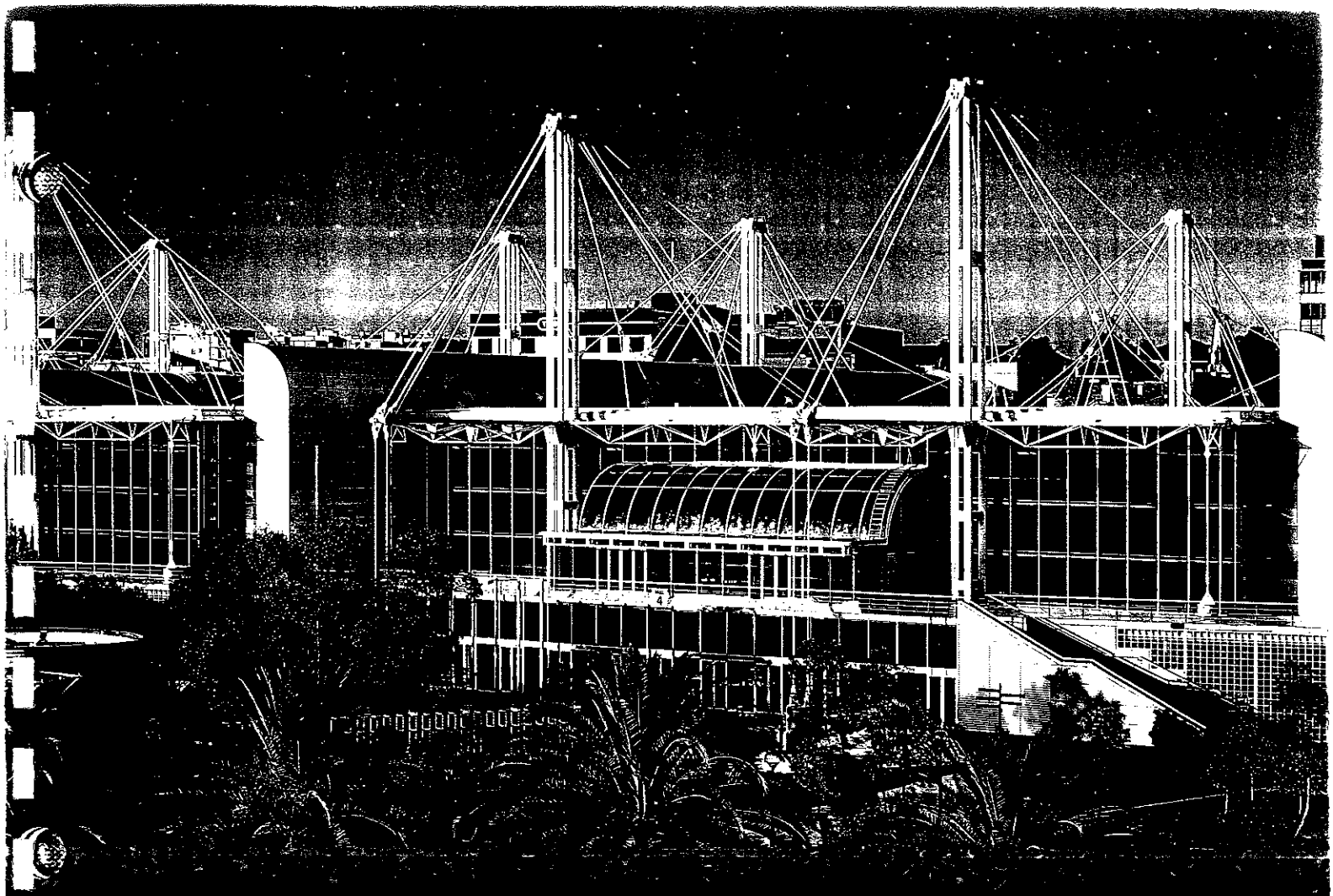
Site Lighting Information and Documentation

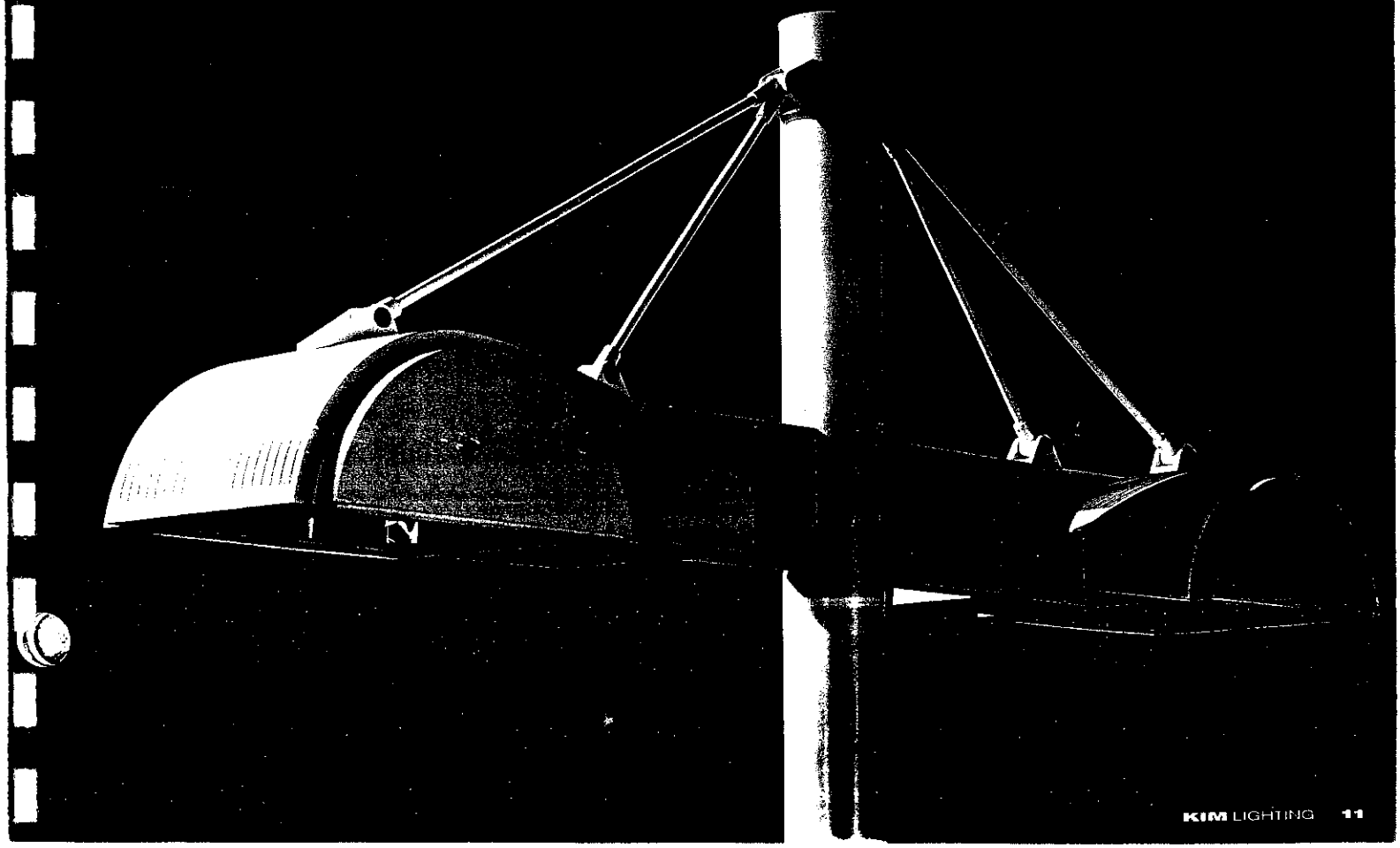
Roadway lighting is being designed per IES recommended standards for illumination levels on intermediate collector-type roadways.

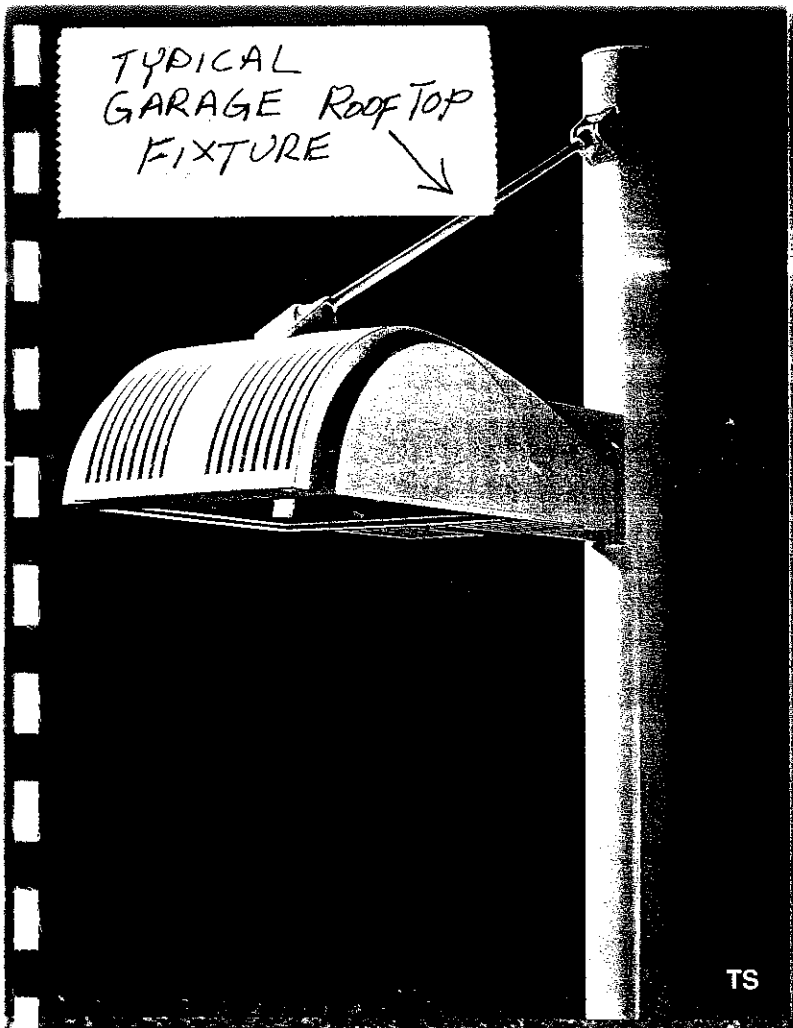
The roadway fixtures will be cutoff type luminaires with Type II or Type III distribution. Poles shall be 30' above finished grade and spaced approximately 130' apart. These fixtures will also be equipped with house side shields that reduce the amount of light reflected behind the poles. The light source shall be a metal halide lamp to achieve good color rendition.

The following catalog cuts provide information on the lighting fixtures proposed for the project.

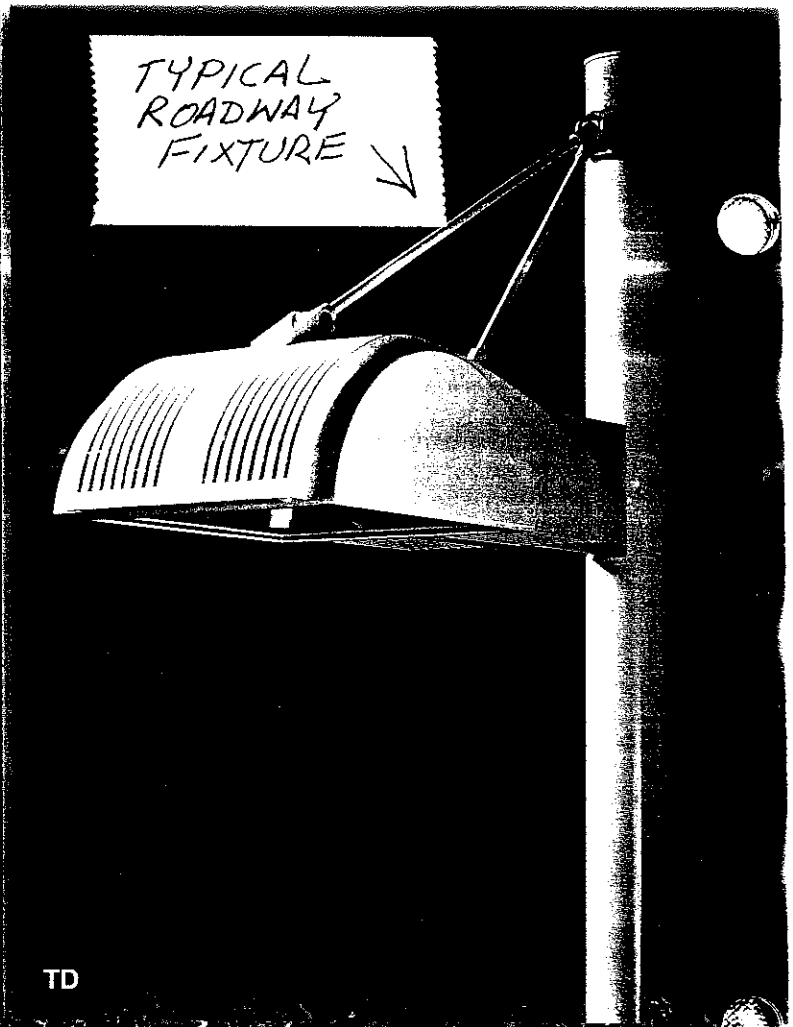






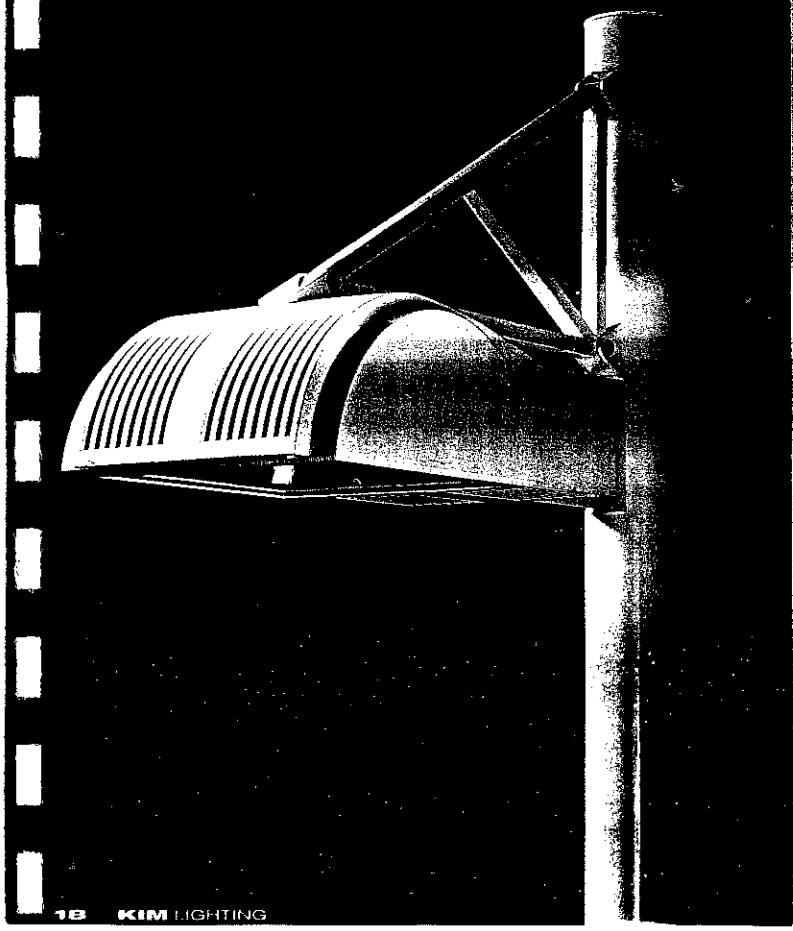


TS

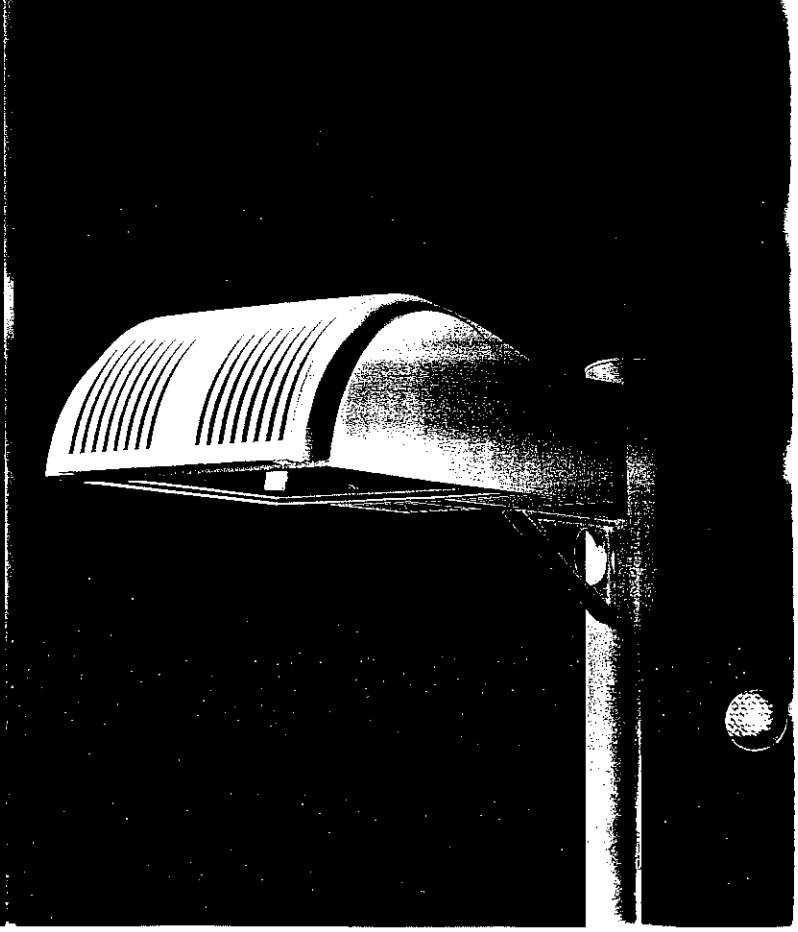


TD

TR



GS



Ordering Information

Large Structural *Roadway*

STL
Mogul Base
150 to 400 Watt

Ordering Example:

For Fixture, Structural Option and Pole

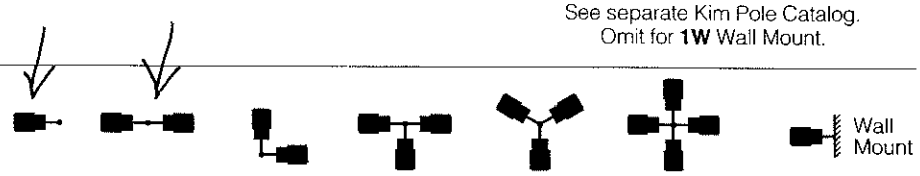
Mounting	Fixture	Electrical Module	Finish	Options	Structural Option	Pole
2B /	**STL3** /	**400MH277** /	**PS-P** /	**A-25** /	**TSN** /	**PRA25-6188B-TS** / **PS-P**
1	2	3	4	5-11	12	13

See separate Kim Pole Catalog. Omit for **1W** Wall Mount.

1 Mounting:

3Y configuration is available for round poles only.

Plan View:



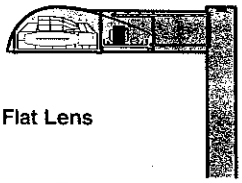
EPA:	2.2	4.4	2.8	5.0	5.0	5.3	n/a
Cat. No.:	**1A**	**2B**	**2L**	**3T**	**3Y**	**4C**	**1W**

2 Fixture:

Cat. No. designates **STL** fixture and light distribution.

See the Kim Site/Roadway Optical Systems Catalog for detailed information on reflector design and application.

Horizontal Lamp



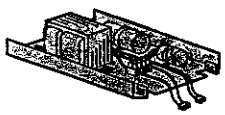
Flat Lens

Light Distribution:	Type II	Type III	Type IV Forward Throw	Type V Square
Cat. No.:	**STL2**	**STL3**	**STL4**	**STL5**

3 Electrical Module:

HPS = High Pressure Sodium
MH = Metal Halide
PMH = Pulse Start Metal Halide

See lamp and electrical data on pages **24** - **25** for ballast types and characteristics.



Lamp Watts	Lamp Type	Line Volts
400	**HPS**	**277**

150HPS120	**250HPS120**	**400HPS120**		
150HPS208	**250HPS208**	**400HPS208**		
150HPS240	**250HPS240**	**400HPS240**		
150HPS277	**250HPS277**	**400HPS277**		
150HPS347	**250HPS347**	**400HPS347**		
150HPS480	**250HPS480**	**400HPS480**		
175MH120	**250MH120**	**400MH120**	**250PMH120**	**400PMH120**
175MH208	**250MH208**	**400MH208**	**250PMH208**	**400PMH208**
175MH240	**250MH240**	**400MH240**	**250PMH240**	**400PMH240**
175MH277	**250MH277**	**400MH277**	**250PMH277**	**400PMH277**
175MH347	**250MH347**	**400MH347**		**400PMH347**
175MH480	**250MH480**	**400MH480**		**400PMH480**

4 Finish:

Super TGIC powder coat paint over chromate conversion coating.

Color:	Black	Dark Bronze	Light Gray	Platinum Silver	White	*Custom Colors
Cat. No.:	**BL-P**	**DB-P**	**LG-P**	**PS-P**	**WH-P**	**CC-P**

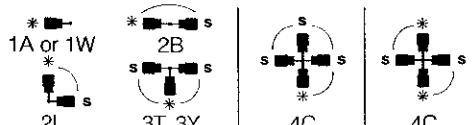
*Consult representative for custom colors.

5 Optional Photocell Receptacle:

Receptacle provided for NEMA base photocells (by others).

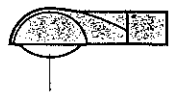
Cat. No.: **A-25**

Mounting Configuration
* – Fixture with Photocell Receptacle
s – slave unit(s)



Allowable Wattage per fixture:	150-400W		150-250W	400W

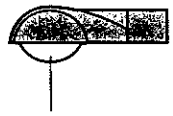
6 Optional Convex Glass Lens:



Convex Lens

Cat. No.: **CGL** Tempered convex glass lens replaces standard flat lens.

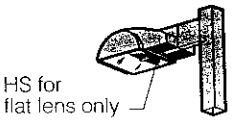
7 Optional Polycarbonate Shield:



Polycarbonate Shield

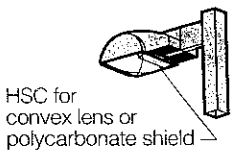
Cat. No.: **LS** Polycarbonate Shield replaces standard tempered glass lens. 250 Watt Maximum. May be used with 400HPS in outdoor locations were ambient air temperature during fixture operation will not exceed 85°F. See **"CAUTION"** on page **17**.

8 Optional Houseside Shield:



Cat. No.: **HS**

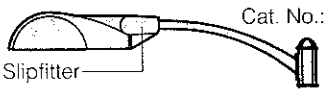
Recommended for use with clear lamps only. Effectiveness is reduced for coated lamps. Not for use with Type V light distribution.



Cat. No.: **HSC**

For fixtures with optional convex glass lens. Not for use with Type V light distribution.

9 Optional Horizontal Slipfitter Mount:



Cat. No.: **HSF**

Replaces standard mounting arm with a slipfitter for mounting to a horizontal pole davit-arm with 2" pipe-size mounting end (2⅜" O.D.). Provides ±5° vertical fixture adjustment.

10 Special Options for Street Lighting:

Cat. No.: **TB** Terminal Block located inside the fixture electrical compartment.

Cat. No.: **AF** Air Filter to allow ventilation through the optical chamber.

11 Optional Vertical Slipfitter Mounts:

Mounting Configuration
1A - Single arm mount
2B - 2 at 180°
2L - 2 at 90°
3T - 3 at 90°
3Y - 3 at 120°
4C - 4 at 90°

For Standard Fixtures

Cat. No.		Cat. No	
VSF-1A		**SVSF-1A**	
VSF-2B		**SVSF-2B**	
VSF-2L		**SVSF-2L**	
VSF-3T		**SVSF-3T**	
VSF-3Y			
VSF-4C	4" Round	**SVSF-4C**	4" Square

For Fixtures with Structural Options

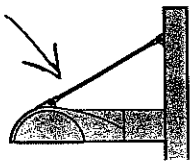
Cat. No.		Cat. No	
STRF-1A		**STSF-1A**	
STRF-2B		**STSF-2B**	
STRF-2L		**STSF-2L**	
STRF-3T		**STSF-3T**	
STRF-3Y			
STRF-4C	4" Round	**STSF-4C**	4" Square

Allows fixture, arm, and Structural Option (when applicable) to be mounted to steel poles having a steel 2" pipe-size tenon (2⅜" O.D. x 4½" min. length). Not available for **GS** Gusset.

12 Structural Options:

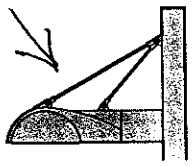
Pole Mounted Structural Options

Single Tension



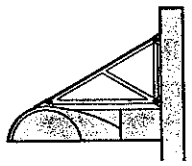
Cat. No.:
TSP - Rod and clevis painted to match fixture
TSN - Stainless steel rod with nickel plated clevis

Double Tension



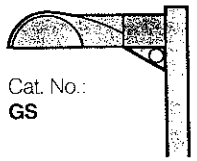
Cat. No.:
TDP - Rod and clevis painted to match fixture
TDN - Stainless steel rod with nickel plated clevis

Truss



Cat. No.:
TR

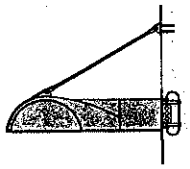
Gusset



Cat. No.:
GS

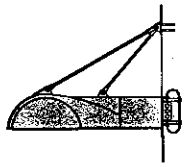
Wall Mounted Structural Options

Single Tension



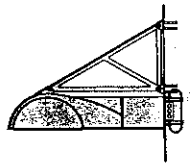
Cat. No.:
TSP-W - Rod and clevis painted to match fixture
TSN-W - Stainless steel rod with nickel plated clevis

Double Tension



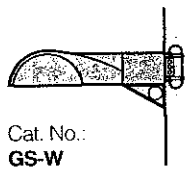
Cat. No.:
TDP-W - Rod and clevis painted to match fixture
TDN-W - Stainless steel rod with nickel plated clevis

Truss



Cat. No.:
TR-W

Gusset



Cat. No.:
GS-W

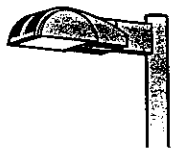
13 Poles:

See Kim Pole Catalog for a complete selection of round and square poles in aluminum or steel.

Ordering Information

Small Structural GARAGE Roof Top

STS
Medium Base
70 to 175 Watt



Ordering Example:
For Fixture, Structural Option and Pole

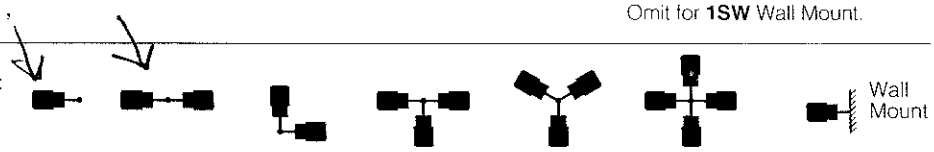
Mounting	Fixture	Electrical Module	Finish	Options	Structural Option	Pole
2SB /	**STS3** /	**175MH277** /	**WH-P** /	**A-33** /	**TSN** /	**PRA12-34188SB-TS** / **WH-P**
1	2	3	4	5-11	12	13

See separate Kim Pole Catalog. Omit for **1SW** Wall Mount.

1 Mounting:

3SY configuration is available for round poles only.

Plan View:



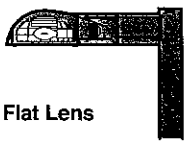
EPA:	1.1	2.2	1.5	2.6	2.6	2.7	n/a
Cat. No.:	**1SA**	**2SB**	**2SL**	**3ST**	**3SY**	**4SC**	**1SW**

2 Fixture:

Cat. No. designates **STS** fixture and light distribution.

See the Kim Site/Roadway Optical Systems Catalog for detailed information on reflector design and application.

Horizontal Lamp



Flat Lens

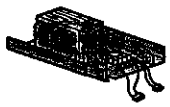
Light Distribution:	Type II	Type III	Type IV Forward Throw	Type V Square
Cat. No.:	**STS2**	**STS3**	**STS4**	**STS5**

3 Electrical Module:

HPS = High Pressure Sodium

MH = Metal Halide

See lamp and electrical data on pages **24** - **25** for ballast types and characteristics.



Lamp Watts	Lamp Type	Line Volts
150	**HPS**	**120**

70HPS120	**100HPS120**	**150HPS120**	
70HPS208	**100HPS208**	**150HPS208**	
70HPS240	**100HPS240**	**150HPS240**	
70HPS277	**100HPS277**	**150HPS277**	
70HPS347	**100HPS347**	**150HPS347**	
70MH120	**100MH120**	**150MH120**	**175MH120**
70MH208	**100MH208**	**150MH208**	**175MH208**
70MH240	**100MH240**	**150MH240**	**175MH240**
70MH277	**100MH277**	**150MH277**	**175MH277**
70MH347	**100MH347**	**150MH347**	**175MH347**

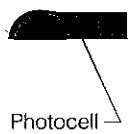
4 Finish:

Super TGIC powder coat paint over chromate conversion coating.

Color:	Black	Dark Bronze	Light Gray	Platinum Silver	White	*Custom Colors
Cat. No.:	**BL-P**	**DB-P**	**LG-P**	**PS-P**	**WH-P**	**CC-P**

*Consult representative for custom colors.

5 Optional Photocell Control:

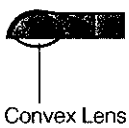


Cat. No. and Line Volts:
A-30 120V
A-31 208V
A-32 240V
A-33 277V
A-35 347V

Mounting Configuration
* – Fixture with Photocell Sensor
s – slave unit(s)

No fixture wattage limit.

6 Optional Convex Glass Lens:



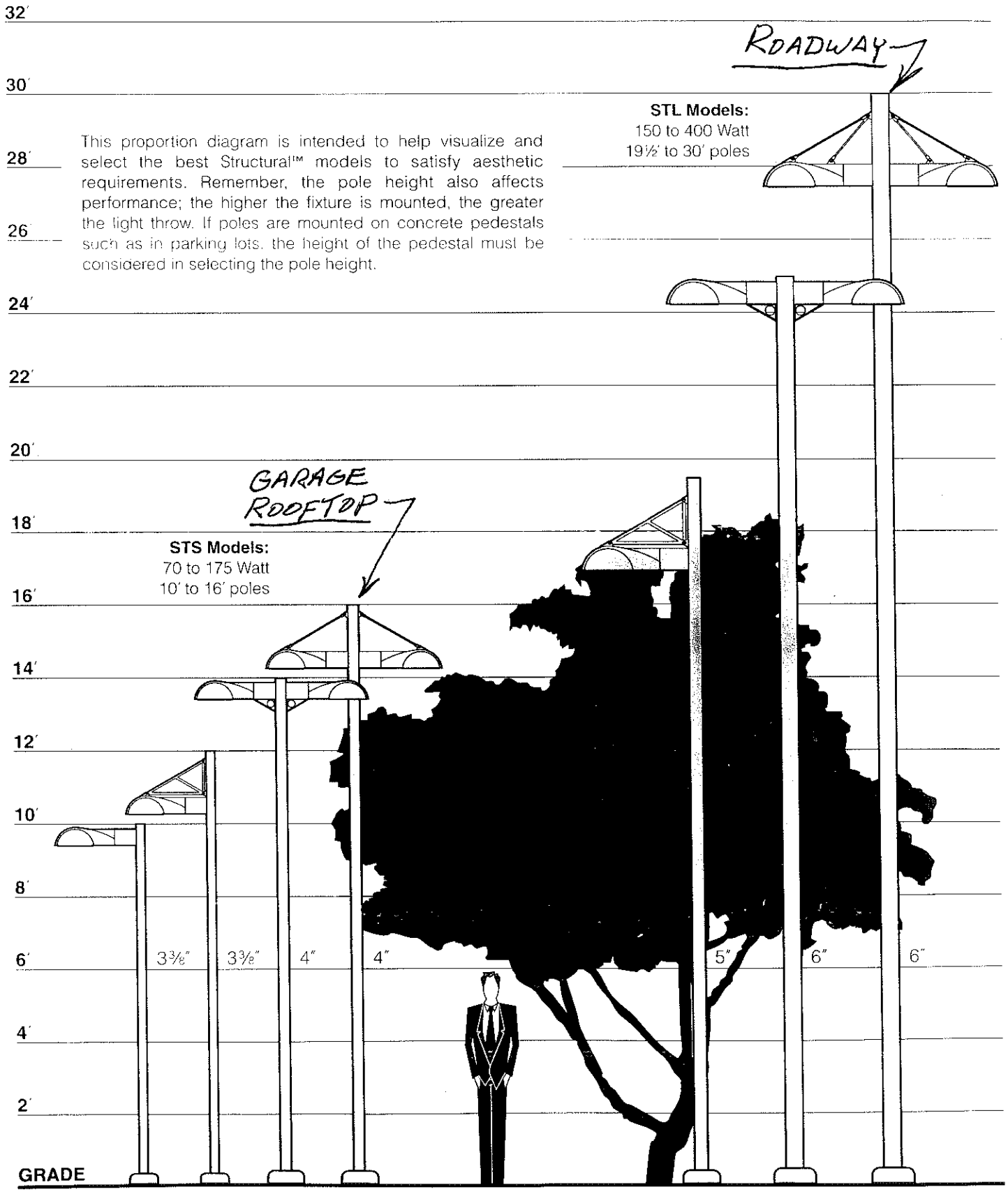
Cat. No.: **CGL** Tempered convex glass lens replaces standard flat lens.

7 Optional Polycarbonate Shield:

Cat. No.: **LS** Polycarbonate Shield replaces standard tempered glass lens. 250 Watt Maximum. May be used with 400HPS in outdoor locations were ambient air temperature during fixture operation will not exceed 85°F. See **"CAUTION"** on page **17**.

Proportion Guide

70 to 400 Watt / 10′ to 30′ Poles



This proportion diagram is intended to help visualize and select the best Structural™ models to satisfy aesthetic requirements. Remember, the pole height also affects performance; the higher the fixture is mounted, the greater the light throw. If poles are mounted on concrete pedestals such as in parking lots, the height of the pedestal must be considered in selecting the pole height.

Section 12

LANDSCAPING

Overview

Landscaping involved in the Phase I Improvements for the proposed parking garage Portland International Jetport will include the following:

- Improvements in Pedestrian Movement From Outlying Parking Areas to the Terminal
- Site Landscaping Around the New Parking Garage, Parking Areas, and Loop Road
- Providing Additional Visual Buffers Between the Stroudwater Area and the Site

Pedestrian Movement

Movement of pedestrian between the terminal building and outlying parking areas has been a prime concern in the development of the Phase I Parking Garage. The design for pedestrian corridors has been closely coordinated with on-going projects at the Jetport. The Jetport has started by planning to construct two raised traffic tables and covered walkways between the existing parking garage and the terminal. Future improvements at the site will tie into these features. In particular for the Phase I Parking Garage, the following will be constructed.

- Extend/modify the existing designated walkway to the west of the existing parking garage
- Provide a dedicated crosswalk through the reconfigured western surface parking lot
- Construct a covered pedestrian walkway along the eastern edge of the existing parking garage that will ramp down to the CCRF

Site Landscaping

New plantings and site amenities will be incorporated into the new parking garage construction. Drawing L1-1, included herein details the location and types of site improvements to be implemented. Generally, the following areas will receive landscape improvements.

- Between the Loop Road and the CCRF (Consolidated Car Rental Facility)
- Between the Loop Road and the Baggage Claim Parking area
- Along the northwestern side of the new Loop Road, near the intersection of International Drive.

Section 12

LANDSCAPING

Visual Barricades

The following description is presented in addition to the planting plans (L1) and planting details (L2) for the Portland International Jetport dated January 9, 2001. This is a planting description outlining proposed planting along the south side of Jetport Drive

- The goal of the planting will be to screen the traffic and / or the proposed parking facilities at the jetport from the residential neighborhood to the northwest.

- The plantings will include the following evergreen screen trees:
  A. Thuja Occidentalis 'Nigra'- Dark American Arborvitae
  B. Tsuga Canadensis - Canadian Hemlock
  C. Pinus Strobus - Eastern White Pine

- The plantings will also include deciduous trees and shrubs to serve as accents to the evergreen buffer and to celebrate the entrance into the jetport.
  A. Rhododendron Catawbiense V. - White Rhododendron
  B. Syringa vulgaris - Common Lilac
  C. Lupinus - Lupine Native

- All plants along jetport drive will need to be tolerant of sun, salt, and variable soil conditions.

- Quantities of each plant species are listed on a separate 8.5 x 11" page Titled:
  L3 - Jetport Drive Landscape Plan.

All proposed plantings on Jetport Drive shall conform to the planting specifications listed on page L2 of the planting plans.

L-3 PLANT SCHEDULE

Jetport Drive at Portland International Jetport

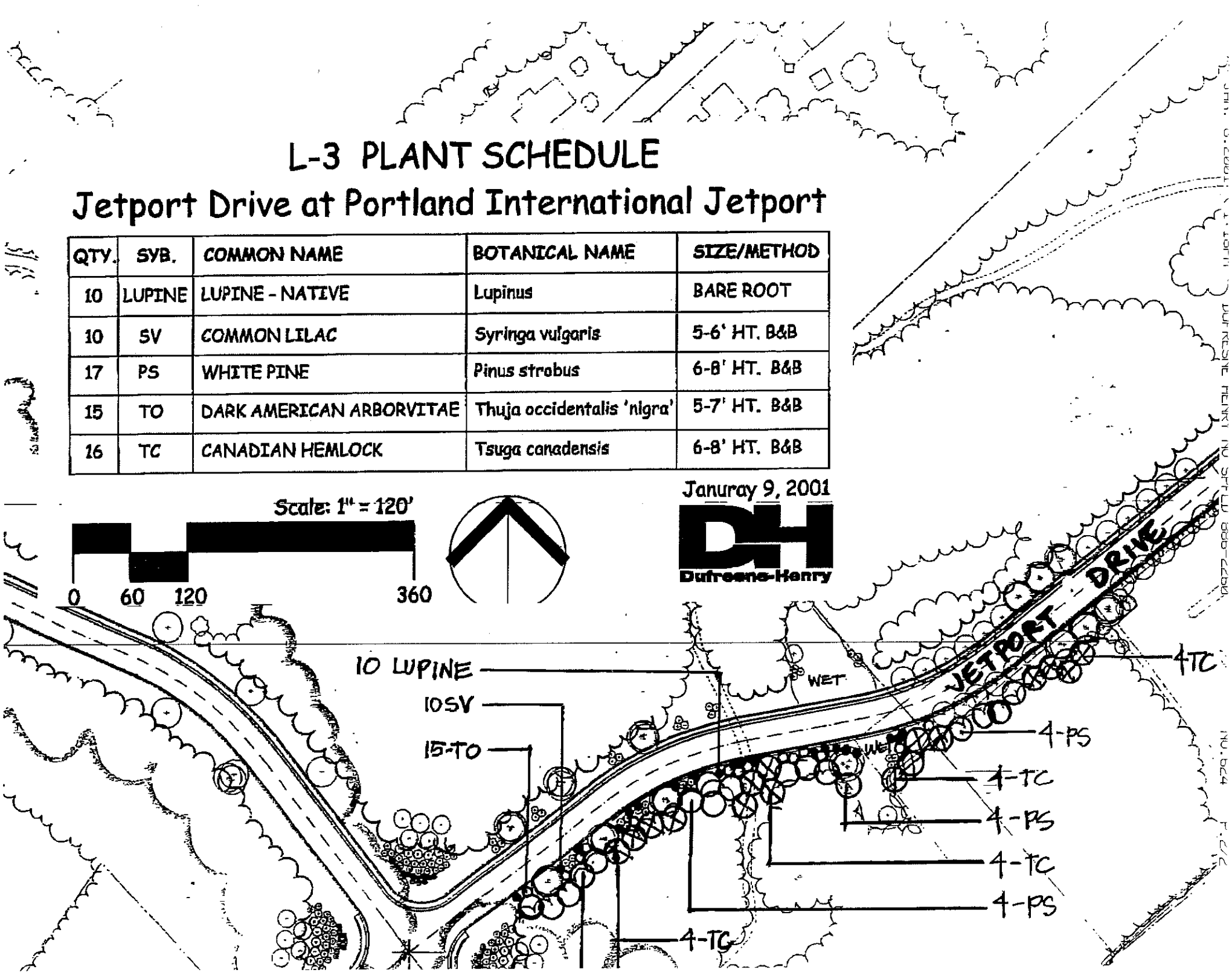
QTY.	SYB.	COMMON NAME	BOTANICAL NAME	SIZE/METHOD
10	LUPINE	LUPINE - NATIVE	Lupinus	BARE ROOT
10	SV	COMMON LILAC	Syringa vulgaris	5-6' HT. B&B
17	PS	WHITE PINE	Pinus strobus	6-8' HT. B&B
15	TO	DARK AMERICAN ARBORVITAE	Thuja occidentalis 'nigra'	5-7' HT. B&B
16	TC	CANADIAN HEMLOCK	Tsuga canadensis	6-8' HT. B&B

Scale: 1" = 120'

0 60 120 360

Januray 9, 2001

Dufresne-Henry



Section 13

EROSION AND SEDIMENTATION CONTROL

Erosion and Sedimentation Control Plan

This plan has been developed to provide a strategy for controlling soil erosion and sedimentation during and after construction of the proposed development. This plan is based on Standards and Specifications for Erosion Prevention in Developing Areas as contained in Maine Erosion and Sediment Control Handbook for Construction: Best Management Practices, March 1991.

General Construction Details

The equipment anticipated to be used for construction includes the following: backhoe, bulldozer, loader, trucks, cranes, compactor, and a grader. Intensive on-site erosion control methods will be utilized. The following measures will be undertaken to provide maximum protection to the soil, water, and abutting lands:

1. Prior to grubbing or any earthmoving operation, siltation fence will be installed across the slope on the contour at the downhill limit of the work as protection against construction related erosion and to discourage construction equipment from entering wetland areas.

2. Permanent soil erosion control measures for all slopes, channels, ditches, or any disturbed land area will be completed within fifteen (15) calendar days after final grading has been completed. When it is not possible or practical to permanently stabilize disturbed land, temporary erosion control measures will be implemented within thirty (30) calendar day of exposure of soil. All disturbed areas will be mulched for erosion control upon completion of rough grading.

3. Any exposed slopes greater than 3:1 will be stabilized with erosion control mesh to prevent erosion during construction and to facilitate revegetation after loaming and seeding. All ditch bases to be seeded shall also be lined with erosion control mesh to stabilize the ditch channels until vegetation is established.

4. Native topsoil shall be saved, stockpiled, mulched and reused as much as possible on the site. Siltation fence shall be installed at the base of stockpiles at the downhill limit to protect against erosion. Stockpiles will be stabilized by seeding and mulching upon formation of the piles. Uphill of the stockpiles, stabilized ditches and/or berms will be constructed to divert stormwater runoff away from the piles.

5. All siltation fence will be inspected by the contractor on a weekly basis or following any significant rainfall (1/2 inch or more) or snowmelt. All damaged siltation fence will be repaired and/or replaced immediately. Trapped sediment will be removed before it has accumulated to one half of the installed siltation fence height. Siltation fence no longer

serviceable due to sediment accumulation will also be repaired and/or replaced as necessary.

6. If final seeding of the disturbed areas is not completed by September 15 of the year of construction, then within the next ten (10) calendar days these areas will be graded and smoothed, then seeded to a winter cover crop of rye at a rate of 3 lbs. per 1,000 sq. ft. The following will be incorporated into the soil prior to rye seeding: ground limestone at a rate of 130 lbs. per 1,000 sq. ft., followed by a 10-10-10 fertilizer at a rate of 14 lbs. per 1,000 sq. ft. Hay mulch will be applied at a rate of 100 lbs. per 1,000 sq. ft. following seeding. If the rye seeding cannot be completed by October 1, then on that date, hay mulch shall be applied at the rate of 100 lbs. per 1,000 sq. ft. A suitable binder such as Curasol or RMB Plus shall be used on hay mulch for wind control. Biodegradable netting will be installed on steep slope (3:1 and steeper) and on areas of concentrated flows.

7. Intercepted sediment will be returned to the site and incorporated into landscaped areas.

8. Should construction be delayed after October 1, additional erosion control methods will be implemented. Sod will be placed in all ditch channel sections where vegetation has not been established. Sod will extend to a height of one foot above ditch channel bottom. All disturbed areas will be minimized as much as possible. Prior to freezing, additional erosion control devices will be installed as appropriate. Inspection of these erosion control items will be constant, with particular attention paid to weather predictions to ensure that these measures are properly in place to handle large amounts of runoff from heavy rains or thaws.

9. The contractor shall stabilize all disturbed areas after November 15 for the winter season.

Seeding and Revegetation Plan

Upon completion of site construction, all areas previously disturbed will be treated as stated below. These areas will be closely monitored by the contractor until such time as a satisfactory growth of vegetation is established.

1. Loam will be spread over all disturbed areas not subject to other restoration (paving, etc.) and graded to a uniform depth of four (4) inches.

2. The following will be incorporated into the soil prior to seeding; agricultural limestone at the rate of 130 lbs. per 1,000 sq. ft., followed by 10-10-10 fertilizer at the rate of 14 lbs. per 1,000 sq. ft.

3. Disturbed areas will be seeded at the rate of 3 lbs. per 1,000 sq. ft. of the following mixture: 47% tall fescue, 48% creeping red fescue, and 5% redtop.

4. Ditch areas will be seeded at a rate of 3 lbs per 1,000 sq ft of the following mixture: 47% tall fescue, 48% creeping red fescue, and 5% redtop.

5. Seeding will be completed between the dates of May 1 and September 15. Irrigation may be required during the period of June 1 to August 15.

6. Hay mulch will be applied at the rate of 100 lbs. per 1,000 sq. ft. following seeding. Mulch shall be anchored by watering flat areas, using anchoring emulsion on areas of moderate slopes and installing biodegradable nets on steep slopes (3:1 and steeper).

7. All sediment control structures will remain in place until vegetation is established. Established means a minimum of 75% of the area is vegetated with vigorous growth.

Monitoring Program

Sedimentation and erosion control structures will be inspected weekly by the contractor, and all structures damaged by construction equipment, vandals, or the elements will be repaired immediately. Following rainstorms and during runoff events, the site and all structures will be inspected for erosion and damage. All damaged structures will be repaired and/or additional erosion control structures will be installed prior to continuing the construction.

Following the final seeding, the site will be inspected to ensure that the vegetation has been established. Re-seeding will be carried out, with follow-up inspections, in the event of any unsatisfactory growth.

After the construction inspector has determined that the project area has stabilized, the contractor shall remove all siltation fence and any other temporary erosion control measures.

Implementation and monitoring of erosion control measures will be the responsibility of the contractor under the supervision of the project engineer and construction inspector.

Schedule

Construction of the project will take place under two construction contracts. Actual construction will start in April and last through November 2002. A detailed construction phasing plan has been developed for both contracts and is included in the set of drawings.

Section 14

STORMWATER MANAGEMENT

1.0 INTRODUCTION

Growth at the Portland International Jetport has resulted in a shortage of sufficient parking spaces due to increased enplanements and boardings. This shortage was documented in the Conceptual Needs Study prepared by Walker Parking Consultants for the city of Portland in March 1999. This study identified both long and short term parking requirements at the Jetport based on current enplanements and estimated future enplanements. The increase in enplanements has precipitated an immediate need for additional parking in the form of a parking garage with approximately 1,200 cars.

In September 2000, Domenech, Hicks and Krockmalnic in association with Rich and Associates, and Dufresne-Henry completed a Parking Master Plan that recommended a three phase plan aimed at addressing parking needs for the next twenty year period. This Parking Master Plan was presented to the City Planning Board on September 26, 2000. The immediate need for available parking spaces has prompted the city of Portland and the Portland International Jetport to undertake the proposed Phase I parking improvements. The Phase I improvements will include the following:

- Construction of a new 1,480 +/- car parking garage,
- Construction of a new 7,500 square foot Consolidated Car Rental Facility (CCRF),
- A new loop road that will circle the new garage and create an infield area where future garage expansions will take place,
- Relocation of numerous utilities, including primary electrical and telephone service to the facility,
- Construction of a 2,050 square foot Parking Management Office,
- A recessed level of the garage set aside for rental car operations,
- An overpass structure that will carry traffic on the loop road over the ramp for drop-off and returns for the rental car operation,
- Several retaining walls achieve grade separation, and
- Planting of a hundred trees along the south side of Jetport Drive to provide additional visual buffers between the garage and the surrounding area.

The Phase I improvements are aimed at accomplishing the following:

- Relieving parking congestion for the next 5 to 10 years,
- Optimizing car rental operations,
- Improving passenger operations, and
- Optimizing vehicular operations.

To accommodate loss of parking during the construction, one or more temporary parking lots will be provided as part of the project. An off-site parking area is envisioned by airport personnel adjacent to the city's new snow dump off from Outer Congress Street.

2.0 EXISTING CONDITIONS

As discussed above, the new construction will require the relocation of several utilities including existing stormwater drainage structures. In addition, the proposed project will require that an existing detention pond be filled in to accommodate the new loop road. Due to the construction of additional impervious area including a new parking structure, the construction of new parking lot, and new loop road, present development stormwater runoff conditions and future development stormwater conditions were evaluated. This drainage analysis is intended to determine the impacts to stormwater discharge and water quality that will be created by the new construction and alterations in the current stormwater runoff patterns.

Dufresne-Henry has determined that the runoff generated within the project area ultimately discharges to the Fore River and subsequently to the Atlantic Ocean.

3.0 METHODOLOGY

In order to compare present and future stormwater characteristics of the site, computer modeling using Hydrocad software was employed. This program incorporates the methodology outlined in the U.S. Natural Resources Conservation Service's (NRCS) Technical Release Number 20 (TR-20). The peak runoff rate for the10 year, 24-hour storm event was calculated. Based on Appendix D-3 in the "Stormwater Management for Maine: Best Management Practices" dated November 1995, the one-day precipitation value for the Portland International Jetport site for the 10 year storm is 4.37 inches.

Since the airport is located in Cumberland County, a Type III distribution was utilized throughout this study. All curve number and time of concentration calculations may be found along with computer-generated documentation in Attachments 14-C and 14-D.

4.0 SOILS

The soil types were identified using the Cumberland County Medium Intensity Soil Survey published by the NCRS. Soil types were analyzed based on hydrologic grouping for the purpose of curve number calculations. The NCRS Medium Intensity Soil Survey identifies the soils within the project area as a Scantic silt loam, which is characterized by slow runoff and moderate to slow permeability. Scantic silt loam soils are also characterized by high water tables, which limit their use for most community and recreational purposes. The SCS Technical Release 55 classifies this type of soil as belonging to hydrologic group 'D'.

5.0 ASSUMPTIONS

In order to estimate the amounts of stormwater runoff generated from the project area, a number of assumptions were made as follows:

Section 14

STORMWATER MANAGEMENT

1. Topography for the site was provided by field surveys conducted by Dufresne-Henry in the spring and summer of 2000. Half-foot contours developed from survey data, as shown on sheets C1-53 and C1-54 of the accompanying Plan Set, were used to analyze stormwater runoff on the site. In the north and northwest portion of the site, beyond available survey data, aerial photography supplied by Eastern Topographic in 1991 which contains 2-foot contours was utilized. Consequently, actual topography may vary from that utilized for analysis. In areas where available topography did not reveal the detail necessary to accurately determine drainage patterns of the site, site investigations were made by Dufresne-Henry, Inc., personnel in August and September of 2000 to determine existing drainage characteristics. Portland International Jetport personnel were also consulted during these site visits.

2. Whenever possible, culvert sizes and inverts were field surveyed or taken from available reference plans. In areas where complete information was not available, pipe slopes and inverts were estimated based on available topography.

   For Entrance Loss Coefficients, catch basin outlets were assumed to be flush with the catch basin wall. CPVC (corrugated polyvinyl chloride) and CPP (corrugated polyethylene) pipes were given Manning's numbers of 0.17 slightly lower than corrugated metal pipes for determining appropriate Entrance Loss Coefficients and Manning's Numbers.

3. Several field observations were made in order to determine the cover types for the project site in the present development condition. For grassed areas surrounding the project site that are mowed frequently and maintained as lawn, and for turf islands within the parking lots, a cover type of open space in good condition was utilized. For areas covered by brush, a cover type of brush in good condition (ground cover >75%) was utilized. For wooded areas, a cover typed of woods in good condition (woods protected from grazing, and litter and brush adequately cover the soil) was utilized. These same cover types were assumed for the future development condition.

4. In the future development condition, it was assumed that all three phase of the parking garage expansion would be completed. This assumes that stormwater from the proposed future Phase III parking garage will be directed in a similar manner to the impervious area of its future location (approximately ½ of the stormwater from the Phase III garage going to Watershed 1 and the other ½ going to Watershed 3). This included the construction of two additional six story parking garages, and the construction of a six story parking garage on the location of the existing parking garage. This was necessary to insure proper sizing of the storm drain system. It is assumed that the majority of runoff from proposed improvements resulting from Phase II and Phase III will drain north-easterly to the outlet of Watershed 1 as shown on sheet C1-54, *Stormwater Post Development Plan.*

6.0 STUDY APPROACH

In order to analyze the impact of the proposed development on the site's stormwater runoff characteristics, the parking garage site was split into 8 separate watershed areas. Refer to Drainage Plans Sheet C1-53 and C1-54 submitted with this report. Watersheds were divided based on the location of their outlets, and the destination of stormwater runoff. Watersheds 1 through 8 are located around the terminal and parking garage area.

7.0 PRESENT DEVELOPMENT CONDITIONS

The following sections detail the evaluation of the impacted watersheds under the present development condition. In the present development conditions, the watershed areas were not divided into subcatchments for each individual catch basin. The analysis was performed modeling the larger subcatchment areas. Modeling in this manner shows that an existing catch basin CB dh-13 in Watershed 1 and an existing catch basin CB D108 in Watershed 3 overtop in the present development conditions. However, no problems with overtopping have been reported by Jetport personnel during storm events. Calculations for the present development conditions are included in Attachment 14-C at the end of this section.

7.1 Watershed 1: Present Development Condition

Watershed 1 is the largest of the 8 watersheds, covering approximately 12.43 Acres of the project site in the present development condition. Runoff primarily drains south-easterly above ground to a collection point in the extreme east of the watershed. An existing detention pond is centrally located which collects a majority of the runoff from the impervious northwest surface parking area within the watershed. A majority of the proposed Phase I improvements will be located within Watershed 1, as well as a portion of the proposed future phase improvements. Watershed 1 is primarily impervious area including the northwest surface parking lot, the north surface parking lot, a portion of the employee parking lot and a gravel parking area associated with the Avis facility. The collection point for Watershed 1 is an existing catch basin D-116 surrounded by a rip-rap apron located near the north-western corner of the Northeast Air Aviation Hangar. The peak runoff rate for Watershed 1 during the 10 year storm event is 18.15 cfs.

7.2 Watershed 2: Present Development Condition

Watershed 2 is approximately 4.17 acres and is comprised of mostly wooded area, some wetlands area and a portion of the access road. Part of the Phase 1 improvements will be located in this watershed including a new surface lot and a portion of the new loop road. Watershed 2 primarily drains in a south easterly direction to an existing ditch. Stormwater drains from the ditch and discharges to a low spot lined with rip rap. The low area outlets via a culvert to an existing catch basin on the south west side of the existing access road. Stormwater from the access road flows to road side catch basins and discharges to an existing stormwater quality unit which also flows into the catch

basin on the southwest side of the existing access road. This catch basin is the collection point for Watershed 2. The peak runoff rate for Watershed 2 during the 10 year storm event is 6.85 cfs.

7.3 Watershed 3: Present Development Condition

Watershed 3 is approximately 4.20 acres. The collection point for Watershed 3 is an existing catch basin CB D108 located in front of the terminal building on the northwest side of the project site. This Watershed collects runoff from a large portion of the surface parking lot west of the existing parking garage, a portion of the employee parking lot, part of the existing access road and part of the existing terminal access road. The peak runoff rate for Watershed 2 during the 10 year storm event is 13.22 cfs.

7.4 Watershed 4: Present Development Condition

Watershed 4 is approximately 5.07 acres. The collection point for Watershed 4 is an existing catch basin CB A33 located adjacent to the southeast corner of the existing terminal building. Watershed 4 receives runoff from a portion of the surface parking lot located west of the existing parking garage, the existing parking garage, the parking areas located north and east of the existing parking garage and a portion of the existing terminal access road. The peak runoff rate for Watershed 4 during the 10 year storm event is 19.89 cfs.

7.5 Watershed 5: Present Development Condition

Watershed 5 is approximately 0.47 acres and primarily consists of the existing Hertz parking. The peak runoff rate for Watershed 5 during the 10 year storm event is 1.97 cfs.

7.6 Watershed 6: Present Development Condition

Watershed 6 is approximately 0.61 acres. The areas contributing runoff to Watershed 6 include the Northeast Air employee parking lot, a portion of the existing loop road and a portion of Westbrook Street. The peak runoff rate for Watershed 6 during the 10 year storm event is 1.93 cfs.

7.7 Watershed 7: Present Development Condition

Watershed 7 is approximately 0.61 acres. Watershed 7 primarily consists of the grassed area between the Northeast Air building and the fire station. The peak runoff rate for Watershed 7 during the 10 year storm event is 2.13 cfs.

7.8 Watershed 8: Present Development Condition

Watershed 8 consists of a portion of the existing Hertz parking lot, the existing tower area, a small area of Westbrook Street, the fire station entrance off the existing loop road

and the grassed area in front of the fire station. Watershed 8 is approximately 0.71 acres. The peak runoff rate for Watershed 8 during the 10 year storm event is 1.95 cfs.

8.0 FUTURE DEVELOPMENT CONDITIONS

Under the future development conditions, the project site was divided into 4 Watershed discharge points. These watersheds were divided into several subcatchments representing drainage areas to catch basins to effectively model stormwater runoff characteristics throughout the watershed. Not all catch basin subcatchments are shown on plan sheet C1-54 as part of the project plans in an effort to minimize confusion on the drawings. However, information for each subcatchment to each proposed catch basin can be found in the Hydrocad output data included in Attachment 14-D at the end of this section. Only those reaches between catch basins that were substantial in length were modeled. The shorter reaches can not be modeled utilizing the Hydrocad software. The short reaches are not recognized and are assumed to have little or no effect on the overall time of concentration. The stormwater system was designed to minimize or prevent an increase in peak runoff rates from present development conditions to future development conditions. The collection points remain the same as the present development conditions.

8.1 Watershed 1: Future Development Condition

The acreage of Watershed 1 in the future development condition is combined with Watershed 4 for a total of approximately 21.88 acres. A portion of the drainage area for Watershed 1 is common with Watershed 4 until the runoff is divided at catch basin DH-33. In the future development condition, Watershed 1 includes a large portion of what was previously included in Watershed 2 under the present development conditions. This includes the wooded area northwest of the new loop road and the wetland area (proposed new surface lot) located north of the existing northwest parking lot. A new ditch has been placed along the north west edge of the new loop road to collect the majority of the runoff previously included in Watershed 2 under present development conditions that is now north west of the new loop road. Runoff is collected in the watershed by a series of catch basins located along the new loop road and catch basins at various locations throughout the surface parking lot west of the new parking garage. Runoff from the new northwest surface lot is collected and discharges into the new storm drain collection system along the new loop road. In addition, runoff from a portion of the employee parking lot (as in present development conditions) collects at a central catch basin and discharges into the catch basin system within the surface parking lot west of the parking garage and ultimately makes its way into the storm drain system along the new loop road.

Runoff from the new loop road, the surface parking lot north of the new parking garage, and half of the new parking garage (6^{th} - 3^{rd} floor levels) is collected by catch basins and meets at a common catch basin DH 33. At this catch basin the runoff flow is split with approximately half of the runoff discharging to existing catch basin D-116 and the other half discharging into the collection system within the new loop road on the east side of the new parking garage which is part of Watershed 4 discussed below. The runoff was

split in an effort to minimize or prevent an increase in peak runoff rates from present development conditions to future development conditions. The peak runoff rate for Watershed 1 under future development conditions during the 10 year storm event is 15.07 cfs.

The results of the modeling show that there is a decrease in peak runoff rates from pre-development to post development conditions for Watershed 1 of 3.07 cfs.

8.2 Watershed 2: Future Development Condition

The area contributing to Watershed 2 in the future development conditions has been significantly reduced from present development conditions and consists primarily of a portion of the existing access road. Therefore, the peak runoff rate for Watershed 2 under future development conditions during the 10 year storm event was not modeled. Due to the decrease in acreage, it is anticipated that there will be a decrease in the peak runoff rate from present development conditions to future development conditions.

8.3 Watershed 3: Future Development Condition

Watershed 3 in the future development condition is approximately 4.77 acres. The areas contributing to Watershed 3 for the most part do not change from the present development conditions. However, area that was previously grassed has been converted to impervious. The peak runoff rate for Watershed 3 under future development conditions during the 10 year storm event is 3.22 cfs.

The results of the modeling show that there is a slight increase in peak runoff rates of approximately 3 cfs from present development conditions to future development conditions for Watershed 3. Watershed 3 ultimately discharges to an existing natural drainage basin east of Taxiway C and north of Taxiway A. Based on available information, the drainage piping appears to have sufficient capacity to carry the additional flow. Based on our discussions with DeLuca-Hoffman and airport personnel, it is our understanding that this natural drainage basin did not overtop during the significant storm in October of 1996 which dropped over 12 inches of rain in 24 hours. In addition, it is our understanding that no backups were reported at the Jetport within the existing storm drainage system.

Based on Appendix D-3 in the "Stormwater Management for Maine: Best Management Practices" dated November 1995, the one-day precipitation value for the Portland International Jetport site for the 100 year storm is 6.21 inches. The October 1996 event proved to be well over the 100 year storm event. Based on this information it is not anticipated that the increase of 3.22 cfs during the 10 year storm event will impact the capacity of the natural drainage basin.

8.4 Watershed 4: Future Development Condition

In the future development condition, Watershed 4 is combined with Watershed 1 for a total of approximately 21.88 acres. A portion of the drainage area for Watershed 4 is common with Watershed 1 until the runoff is divided at catch basin DH-33. Runoff from watershed 4 ultimately collects at a storm drain manhole located immediately east of the existing terminal building. This stormwater runoff ultimately discharges to a natural drainage basin located east and north of taxiways C and A respectively. The following areas contribute runoff to Watershed 4:

- three quarters of the new parking garage (6th through 3rd floor levels)
- 1/2 of the north and north west sections of the new loop road
- ½ of parking lot west of the new parking garage
- 1/2 of the new northwest surface parking lot
- the eastern portion of the new loop road
- the existing parking garage
- a portion of the surface parking lot west of the existing parking garage
- new public parking lot east of the existing parking garage
- southern portion of the new loop road adjacent to the existing parking garage
- the 1st floor level of the parking garage (includes roof of the car rental facility, grassed area between the retaining wall along the eastern portion of the new loop road and the car rental facility, the ramp into the 1st floor level on the east side of the new parking garage, the car rental shuttler's entrance/exit to the 1st floor level on the north side of the new parking garage)

Runoff from the 1st floor level is directed to a new stormwater quality treatment unit below the base slab of the 1st floor level. The treated stormwater then flows by gravity into a new stormwater pump station. The stormwater pump station in turn pumps the treated stormwater to catch basin DH-39 along the new loop road on the east side. The pump station and stormwater quality treatment unit design are included as Attachment 14-A of this section. Alternately, Dufresne-Henry is exploring the possibility of a deep gravity system to handle the stormwater collected at the 1st floor level in an effort to eliminate the stormwater pump station. This alternative is discussed in Attachment 14-B of this section. For purposes of this analysis, the stormwater pump station option has been modeled.

Runoff collected from the 1st floor level, parking garage, loop road, and north surface parking discussed above, discharge to the storm drain system along the new loop road along the east side of the new parking garage. This storm drain system discharges to a large ditch area created between the new loop road and the new public parking lot east of the existing parking garage. This large ditch was created in an effort to slow the peak runoff rates from these areas enough to minimize or prevent an increase in peak runoff

rates from present development conditions to future development conditions. The ditch is approximately 8 feet deep and slopes to an outlet at the southern end. The outlet is a multi-stage outlet structure with orifice openings at various elevations (see plan sheet C1 - 54 of the attached plans) which assists in slowing the peak runoff rates out of the ditch area. The water surface elevation in the ditched area during the 10 year storm event is 60.6 feet. (Note: It is anticipated that the deep gravity system will be constructed to handle the stormwater collected at the 1st floor level in an effort to eliminate the stormwater pump station. This would reduce the total cfs entering the ditched area by approximately 5 cfs. This would in turn lower the water surface elevation during the 10 year storm event. This situation will be modeled upon confirmation of the gravity system.)

The ditch area is designed so the invert of the outlet structure is at the same elevation as the ditch. Therefore, all water will drain from the area upon completion of the storm event. In addition, this area is equipped with a relief culvert at elevation 59.2 feet which allows stormwater to flow into the adjacent shallow area on the east side of the public parking lot exit during storms greater than the 10 year event. Upon completion the storm event, water will drain from the east shallow area back into the deep ditch where it drains from the system. The shallow area to the east also has relief piping from the area to a storm drain system adjacent to the east side of the public parking lot. This system is designed to prevent overtopping of the deep ditch area and the east shallow area during storm events larger than the 10 year storm.

Runoff from the existing parking garage and a portion of the surface lot west of the existing parking garage maintain a similar drainage pattern as in the present development condition. Runoff is directed via storm drain piping through a series of catch basins. Runoff from the new public parking lot and southern portion of the new loop road also drains to this series of catch basins where it is all discharged to the existing catch basin A33 located adjacent to the southeast corner of the existing terminal building.

Runoff from the new surface parking lot between the new loop road and the existing surface parking lot drains to a new catch basin. The stormwater from this catch basin outlets to a shallow grassed area. This shallow grassed area then outlets to the storm drain system along the new loop road. The shallow grassed area has been designed to slow the peak runoff rates from the new surface parking lot prior to discharging to the storm drain system along the new loop road.

The peak runoff rate for Watershed 4 under future development conditions during the 10 year storm event is 23.72 cfs.

The results of the modeling show that there is an increase in peak runoff rates from the present development conditions to future development conditions for Watershed 4 of approximately 3.83 cfs.

STORMWATER MANAGEMENT

Watershed 4 ultimately discharges to a natural drainage basin located east of existing Taxiway C and north of existing Taxiway A. Based on our discussions with DeLuca-Hoffman and airport personnel, it is our understanding that this natural drainage basin did not overtop during the significant storm in October of 1996 which dropped over 12 inches of rain in 24 hours. In addition, it is our understanding that no backups were reported at the Jetport within the existing storm drainage system.

Based on Appendix D-3 in the "Stormwater Management for Maine: Best Management Practices" dated November 1995, the one-day precipitation value for the Portland International Jetport site for the 100 year storm is 6.21 inches. The October 1996 event proved to be well over the 100 year storm event. Based on this information it is not anticipated that the increase of 3.83 cfs during the 10 year storm event will impact the capacity of the natural drainage basin.

8.5 Watershed 5: Future Development Conditions

The drainage area to Watershed 5 has decreased as a result of the proposed project. Therefore, the peak runoff rate for Watershed 5 under future development conditions during the 10 year storm event was not modeled. It is anticipated that there will be a decrease in peak runoff rates from the present development conditions to future development conditions due to the decrease in acreage.

8.6 Watershed 6: Future Development Conditions

The drainage area to Watershed 6 has decreased as a result of the proposed project. Therefore, the peak runoff rate for Watershed 6 under future development conditions during the 10 year storm event was not modeled. It is anticipated that there will be a decrease in peak runoff rates from the present development conditions to future development conditions due to the decrease in acreage.

8.7 Watershed 7: Future Development Conditions

The drainage area to Watershed 7 has decreased as a result of the proposed project. Therefore, the peak runoff rate for Watershed 7 under future development conditions during the 10 year storm event was not modeled. It is anticipated that there will be a decrease in peak runoff rates from the present development conditions to future development conditions due to the decrease in acreage.

8.8 Watershed 8: Future Development Conditions

The drainage area to Watershed 8 has decreased as a result of the proposed project. Therefore, the peak runoff rate for Watershed 8 under future development conditions during the 10 year storm event was not modeled. It is anticipated that there will be a decrease in peak runoff rates from the present development conditions to future development conditions due to the decrease in acreage.

Section 14

STORMWATER MANAGEMENT

9.0 STORMWATER QUALITY ANALYSIS

9.1 Method of Evaluation

According to MDEP standards, stormwater quality standards must be met if a project includes 20,000 square feet or more of impervious area, or five acres or more of disturbed area in the direct watershed of a waterbody most at risk from new development. The proposed project while not in the direct watershed of a waterbody most at risk from new development does include more than 20,000 square feet of impervious area. Therefore, the project must meet the sliding scale total suspended solids (TSS) standard set by the Maine Department of Environmental Protection (MDEP).

On behalf of the Jetport, an outside consultant is sizing stormwater quality treatment units for the entire jetport site. Coordination is taking place with this outside consultant based on the analysis of the proposed project to ensure that the proposed stormwater quality units are sized to handle the future development conditions.

8.2 Stormwater Quality Analysis

A new stormwater quality treatment unit was sized to remove total suspended solids from the runoff collected at the 1st floor level. See Attachment 14-A at the end of this section for sizing calculations. As discussed above, stormwater quality units for the remainder of the runoff generated from the project site are being sized by the Jetport's outside consultant.

8.3 Basic Stabilization

During the construction of the proposed improvements, the basic stabilization measures standard will be met. Erosion and sediment control will be provided in accordance with standards outlined in the "Maine Erosion and Sediment Control Handbook for Construction: Best Management Practices" (Cumberland County SWCD and Maine DEP, 1991).

9.0 SUMMARY AND CONCLUSIONS

The proposed project is not expected to impact stormwater discharge or water quality. As discussed, the increase in the peak runoff rate in the future development condition for Watershed 4 is not anticipated to impact the natural drainage area capacity during the 10 year storm event due to the fact that the natural drainage basin had sufficient capacity to accommodate the flow from the October 1996 storm event which dropped over 12 inches of rain in 24 hours in the Portland area. In addition, stormwater treatment units are being sized and located to treat stormwater generated from the project site. Dufresne-Henry is continuing coordination with the outside consultant. A summary comparison of the present development conditions to the future development conditions is shown on the following page.

Section 14

STORMWATER MANAGEMENT

Table 14-1

Portland International Jetport
Summary of Present and Future Development Peak Runoff Rates

Drainage Area	Storm Event	Present Development runoff, cfs	Future Development runoff, cfs	Increase/Decrease cfs
Watershed 1	10 Year	18.15	15.07	- 3.08
Watershed 2	10 Year	6.85	Not evaluated	
Watershed 3	10 Year	13.22	16.44	+ 3.22
Watershed 4	10 Year	19.89	23.72	+3.83

ATTACHMENT 14 - A

STORMWATER PUMP STATION DESIGN

STORMWATER MANAGEMENT
ATTACHMENT A – STORMWATER PUMP STATION DESIGN

Background Information

A portion of the proposed parking garage is approximately 12 to 13 feet below finished grade. Because of this portions of the site drain to a pump station that will be located below the slab of the 1st floor level. The areas contributing to the pump station include the ramps into and out of the 1st floor level (below grade level), a few grassed areas, the roof of the proposed car rental facility, and floor drains from the 1st and 2nd floor levels. The areas contributing to the pump station are shown on sheet C1-54 "Stormwater Post-Development Plans" of the project plans. Details of the pump station and a schematic drawing of its location within the garage is shown on sheet C1-55 "Stormwater Details" of the project plans.

On behalf of the Jetport, Dufresne-Henry is also exploring the possibility of a gravity stormwater drainage system from the 1st floor level in an effort to eliminate the stormwater pump station and minimize maintenance requirements. This option is discussed separately in an Attachment B of this section.

Basis of Design

The stormwater runoff values were calculated using the rational method (Q = CIA). Runoff rates were developed for the 1, 10, 25 and 50 year storm events. The results of these calculations are attached.

The stormwater pump station consists of duplex submersible stormwater pumps, a wet well, and valve vault. Each pump has been designed to discharge at a rate equal to the 25 year storm. The pump station is equipped with both low and high level alarms and will be tied into the emergency generator serving the garage. This will ensure that stormwater pumping capabilities will continue in the event of a power outage. The stormwater pump station design conditions are attached and shown on sheet C1-55 "Stormwater Details" of the project plans.

Stormwater will be pumped from the pump station via a 12-inch force main which will discharge to a new catch basin located along the new loop road.

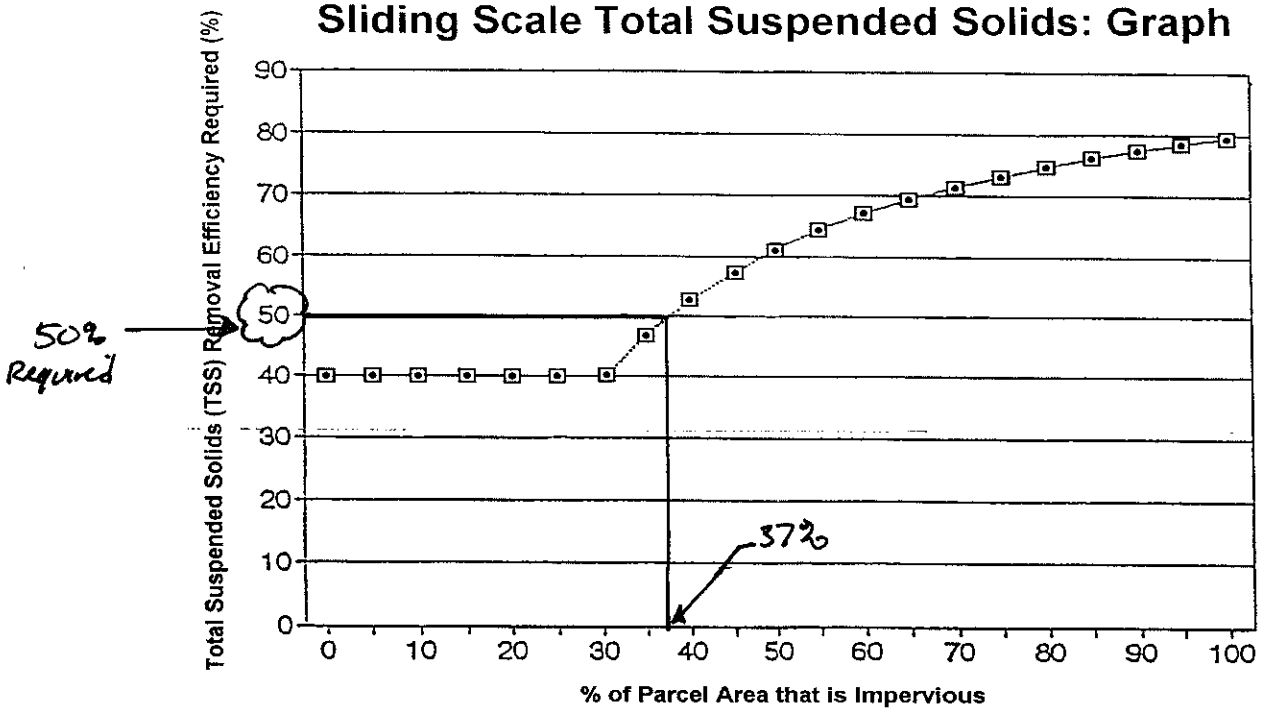
Stormwater Treatment Prior to Pump Station

The total area contributing to the stormwater pump station is approximately 1.24 acres. This is made up of runoff from paved surfaces (37%), a glass roof (30%) and grassed areas (33%). Runoff from the roof areas drain onto a grassed area where sediments (if present) filter out prior to reaching a catch basin adjacent to the proposed garage. Therefore, this area was not considered as part of the overall percentage of impervious area when determining the %Total Suspended Solids (TSS) removal required based on the Maine Department of Environmental Conservation's (MDEP) sliding scale rule.

STORMWATER MANAGEMENT
ATTACHMENT A – STORMWATER PUMP STATION DESIGN

The percent impervious area from paved surfaces (37%) was utilized to establish the required removal efficiency. Based on the attached MDEP Sliding Scale Total Suspended Solids Graph, the removal efficiency required is a little less than 50%. The Stormwater Quality Treatment unit (SQTU) was designed to remove 50% of the TSS. The treatment unit was sized based on providing treatment at 50 gpm/sf based on a 1 year storm event. The stormwater discharged to the pump station will receive further treatment in the existing system prior to discharging to a natural drainage basin as additional Stormwater Quality treatment units are being designed by an outside consultant on behalf of the Jetport. Details of the stormwater treatment unit are shown on sheet C1-55 "Stormwater Details" as part of the project plans.

MDEP SLIDING SCALE TOTAL SUSPENDED SOLIDS: GRAPH



(c) Phosphorus standard. The project must incorporate appropriate stormwater best management practices so that the project will not exceed the allowable per-acre phosphorus allocation for the lake.

An allowable per-acre phosphorus allocation for each lake most at risk will be determined by the department, based upon (i) current water quality, (ii) potential for internal recycling of phosphorus, (iii) potential as a cold-water fishery, (iv) volume and flushing rate, and (v) projected growth in the watershed, and will be used to determine project phosphorus allocations unless the applicant proposes an alternative per-acre phosphorus allocation that is approved by the department. If the project is a new road in a subdivision, only 50% of the parcel's allocation may be applied to the new road unless phosphorus export from both the new road and the new lots is being addressed, in which case the entire allocation for the parcel may be applied.

NOTE: For guidance in calculating per-acre phosphorus allocations and in determining if stormwater phosphorus export from a project meets or exceeds the parcel's allocation, see "Phosphorus Control in Lake Watersheds: A Technical Guide for Evaluating New Development", Maine Department of Environmental Protection (1992).

(d) Basic stabilization standard--Each of the following requirements must be met.

STORMWATER RUNOFF RATE CALCULATIONS
RATIONAL METHOD

PORTLAND JETPORT PARKING GARAGE
STORMWATER PUMP STATION DESIGN
Project Number: 8190016.01
01/05/01
Sheet 1 of ____

SHEET 1 OF 4

Pump Station Basis of Design

1) See Stormwater Post-Development Plans for Areas contributing runoff to pump station. See attached plan sheet C1-54.
2) Pump station to be located inside parking garage below 1st floor slab. See attached plan sheet C1-55.
3) Pump Station shall contain duplex pumps, each designed for the 25 year storm
4) Pump Station details shown on plan sheet C1-55.
5) Determine 10, 25, 50 year storm.
6) Evaluate stormwater quality unit size based on Vortech's Rule #1.

Use Rational Method: Q = CIA

Q = peak rate of runoff, cfs
C = Runoff coefficient
I = average intensity of rainfall, in/hr

1 YEAR STORM

Surface Location	Area, ac	C value *	I **	C x Area
1) Pavement & Roof	0.822	0.95	2.5	0.781
2) Grass (heavy soils, flat)	0.414	0.15	2.5	0.062
TOTALS	1.236			0.843

* See attached Appendix D-11: Runoff Coefficients for the Rational Formula
** See attached Appendix D-1: On Day Storm Precipitation Values (SCS) for Cumberland County SE

Combined C Value = $\frac{\text{Total CxArea}}{\text{Total Area}}$ = 0.682

Q 10 year Storm, cfs = 2.605
gpm = 1167

10 YEAR STORM

Surface Location	Area, ac	C value *	I **	C x Area
1) Pavement & Roof	0.822	0.95	4.37	0.781
2) Grass (heavy soils, flat)	0.414	0.15	4.37	0.062
TOTALS	1.236			0.843

* See attached Appendix D-11: Runoff Coefficients for the Rational Formula
** See attached Appendix D-3: Portland & Cumberland County Precipitation Intensity/Duration (COG)

Combined C Value = $\frac{\text{Total CxArea}}{\text{Total Area}}$ = 0.682

Q 10 year Storm, cfs = 4.553
gpm = 2040

25 YEAR STORM

Surface Location	Area, ac	C value *	I **	C x Area
1) Pavement & Roof	0.822	0.95	5.08	0.781
2) Grass (heavy soils, flat)	0.414	0.15	5.08	0.062
TOTALS	1.236			0.843

* See attached Appendix D-11: Runoff Coefficients for the Rational Formula
** See attached Appendix D-3: Portland & Cumberland County Precipitation Intensity/Duration (COG)

Combined C Value = $\frac{\text{Total CxArea}}{\text{Total Area}}$ = 0.682

Q 25 year Storm, cfs = 5.293
gpm = 2371

50 YEAR STORM

Surface Location	Area, ac	C value *	I **	C x Area
1) Pavement & Roof	0.822	0.95	5.65	0.781
2) Grass (heavy soils, flat)	0.414	0.15	5.65	0.062
TOTALS	1.236			0.843

* See attached Appendix D-11: Runoff Coefficients for the Rational Formula
** See attached Appendix D-3: Portland & Cumberland County Precipitation Intensity/Duration (COG)

Combined C Value = $\frac{\text{Total CxArea}}{\text{Total Area}}$ = 0.682

Q 50 year Storm, cfs = 5.887
gpm = 2637

SHEET 2 OF 4

APPENDIX D-3: Portland & Cumberland County Precipitation Intensity/Duration (COG)

Portland & Cumberland County

Precipitation Intensity/Duration

	2 years		5 years		10 years		25 years		50 years		100 years	
	Cumb. Co. (NOAA 35)	Portland (COG '81)	Cumb. Co. (NOAA 35)	Portland (COG '81)	Cumb. Co. (NOAA 35)	Portland (COG '81)	Cumb. Co. (NOAA 35)	Portland (COG '81)	Cumb. Co. (NOAA 35)	Port. (COG'81)	Cumb. Co. (NOAA35)	Portland (COG '81)
5 minute	0.34	0.312	0.40	0.368	0.45	0.410	0.52	0.471	0.58	0.520	0.63	0.568
10 minute	0.51	0.480	0.63	0.573	0.72	0.641	0.84	0.739	0.93	0.818	1.03	0.895
15 minute	0.63	0.579	0.79	0.699	0.90	0.786	1.05	0.912	1.18	1.01	1.30	1.11
30 minute	0.83	0.758	1.07	0.948	1.23	1.08	1.46	1.27	1.64	1.42	1.82	1.57
1 hour	1.04 (TP 40)	1.00	1.36 (TP 40)	1.24	1.58 (TP 40)	1.40	1.89 (TP 40)	1.65	2.13 (TP 40)	1.83	2.37 (TP 40)	2.02
2 hours	1.4	1.30	1.8	1.46	2.2	1.59	2.45	1.78	2.7	1.94	3.1	2.09
3 hours	1.6		2.1		2.45		2.7		3.1		3.5	
6 hours	2.1		2.65		3.1		3.4		4.0		4.4	
12 hours	2.5		3.4		3.9		4.8		5.0		5.7	
24 hours	3.0	3.18	4.0	3.87	4.7	4.37	5.5	5.08	5.8	5.65	6.7	6.21

TP 40 = "Rainfall Frequency Atlas", Government Printing Office, 1961
NOAA 35 = "Five to 60 Minute Precipitation Frequency for the Eastern and Central U.S.", National Weather Service 1977.
COG '81 = Hand calculations by Joan Feely (GPCOG intern), from "Rainfall Intensity-Frequency Analysis" - Form 612-47, Environmental Science Services Admin., Weather Bureau, adjusted for partial-duration series as in NOAA 35.

(Source: GPCOG, 1981)

Figure D.3. Portland & Cumberland County - Precipitation Intensity / Duration (COG)

SHEET 3 OF 4

APPENDIX D-11: Runoff Coefficients for the Rational Formula

Typical Composite Runoff Coefficients by Land Use.	
Description of Area	C
Business:	
Downtown areas	0.70-0.95
Neighborhood areas	0.50-0.70
Residential:	
Single-family areas	0.30-0.50
Multi units, detached	0.40-0.60
Multi units, attached	0.60-0.75
Suburban	0.25-0.40
Apartment	0.50-0.70
Industrial:	
Light areas	0.50-0.80
Heavy areas	0.60-0.90
Parks, cemeteries	0.10-0.25
Playgrounds	0.20-0.35
Railroad yard areas	0.20-0.35
Unimproved areas	0.10-0.30

Normal Range of Runoff Coefficients.	
Character of Surface	C
Lawns:	
Sandy soil, flat (2%)	0.05-0.10
Sandy soil, ave. (2-7%)	0.10-0.15
Sandy soil, steep (7%)	0.15-0.20
Heavy soil , flat (2%)	0.13-0.17
Heavy soil, ave. (2-7%)	0.18-0.22
Heavy soil, steep (7%)	0.25-0.35
Agricultural land:	
Bare packed soil	
Smooth	0.30-0.60
Rough	0.20-0.50
Cultivated rows	
Heavy soils, no crop	0.30-0.60
Heavy soils with crop	0.20-0.50
Sandy soil no crop	0.20-0.40
Sandy soil with crop	0.10-0.25
Pasture	
Heavy soil	0.15-0.45
Sandy soil	0.05-0.25
Woodlands	0.05-0.25
Pavement	
Asphalt and Concrete	0.70-0.95
Brick	0.70-0.85
Roofs	0.75-0.95

Conservative Use 0.95

NOTE: The designer must use judgment to select the appropriate "C" value within the range for the appropriate land use. Generally, larger areas with permeable soils, flat slopes, and dense vegetation should have lowest "C" values. Smaller areas with slowly permeable soils, steep slopes, and sparse vegetation should be assigned highest "C" values. The range of "C" values presented are typical for return periods of 2-10 years. Higher values are appropriate for larger design storms. (ASCE 1992 and others)

APPENDIX D-1: One Day Precipitation Values (SCS)

Sheet 4 of 4

Table 3-4 24 Hour Duration Rainfalls For Various Return Periods.
Natural Resources Conservation Service County Rainfall Data

		Return Interval or Frequency								
County	Storm Type	1-Yr	2-Yr	5-Yr	10-Yr	25-Yr	100-Yr	500-Yr	Annual	
Androscoggin		2.5	3.0	3.9	4.6	5.4	6.5	7.8	45.3	
Aroostook C		2.1	2.1	3.2	3.6	4.2	5.0	5.9	36.1	(Presque Isle Area)
Aroostook N		2.0	2.3	3.0	3.5	4.0	4.8	5.7	36.1	(Fort Kent Area)
Aroostook S	*S*	2.2	2.5	3.3	3.8	4.4	5.3	6.4	39.0	(Houlton Area)
Cumberland NW	*E*	2.8	3.3	4.3	5.0	5.8	6.9	8.3	43.4	(NW of St. Route 11)
Cumberland SE	*E*	2.5	3.0	4.0	4.7	5.5	6.7	8.1	44.4	(SE of St. Route 11)
Franklin		2.4	2.9	3.7	4.2	4.9	5.9	7.0	45.6	
Hancock		2.4	2.7	3.6	4.2	4.9	6.0	7.2	45.2	
Kennebec	*N*	2.4	3.0	3.8	4.4	5.1	6.1	7.2	41.7	
Knox-Lincoln	*O*	2.5	2.9	3.8	4.4	5.1	6.2	7.4	46.1	
Oxford E	*T*	2.5	3.0	4.0	4.6	5.3	6.4	7.6	43.0	(E of St. Route 26)
Oxford W	*E*	3.0	3.5	4.5	5.2	6.0	7.1	8.4	43.8	(W of St. Route 26)
Penobscot N	*S*	2.2	2.5	3.3	3.8	4.4	5.4	6.4	41.5	(N of Can.-Atl. Rwy)
Penobscot S		2.4	2.7	3.5	4.1	4.8	5.8	6.9	39.5	(S of Can.-Atl. Rwy)
Piscataquis N	*1*	2.2	2.5	3.3	3.8	4.4	5.3	6.3	38.5	(N of Can.-Atl. Rwy)
Piscataquis S		2.3	2.6	3.4	4.0	4.6	5.5	6.6	41.0	(S of Can.-Atl Rwy)
Sagadahoc	*A*	2.5	3.0	3.9	4.6	5.4	6.5	7.8	45.3	
Somerset N	*N*	2.2	2.5	3.3	3.8	4.4	5.3	6.3	37.3	(N of Can.-Atl. Rwy)
Somerset S	*D*	2.4	2.7	3.5	4.1	4.7	5.7	6.8	39.5	(S of Can.-Atl. Rwy)
Waldo		2.5	2.8	3.7	4.3	4.9	6.0	7.1	47.2	
Washington	*2*	2.4	2.5	3.4	4.0	4.8	5.9	7.1	44.2	
York		2.5	3.0	4.0	4.6	5.4	6.6	7.8	46.7	

NOTES: REVISED 4/10/92 Lew P. Crosby

24-HR. DURATION RAINFALL

SOURCES: 24-HR. DATA — TP 40

ANNUAL DATA — CDAN

Note 1: [1]Use ***Type II*** for Oxford County (with the exception of towns listed below) and Penobscot County (with the exception of towns listed below) and all Maine counties not listed below.

Note 2: [2]Use ***Type III*** for York, Cumberland, Androscoggin, Sagadahoc, Kennebec, Waldo, Knox, Piscataquis, Somerset, Franklin, Aroostook, Lincoln, Hancock, Washington Counties; the following Oxford County Towns: Porter, Brownfield, Hiram, Denmark, Oxford, Hebron, Buckfield, and Hartford; and the following Penobscot County towns: Dixmont, Newburgh, Hampden, Bangor, Veazie, Orono, Bradley, Clifton, Eddington, Holden, Brewer, Orrington, Plymouth, Etna, Carmel, Hermon, Glenburn, Old Town, Milford, and Greenfield.

STORMWATER PUMP STATION DESIGN CALCULATIONS

PORTLAND JETPORT PARKING GARAGE
STORMWATER TREATMENT ANALYSIS
Project Number: 8190016.01
01/05/01

SHEET 1 OF 5

Storm Water Pump Station	
Design Conditions	2400 gpm @28'TDH
Q 10 year Storm, gpm	2040
Q 25 year Storm, gpm	2371
Q 50 year Storm, gpm	2637
Force Main Size	12
Wet Well Dimensions	12' w x 12' l x 12.7' d +/-
Top of Pump Station, Elevation	50.21
Bottom of Wet Well	37.52
Invert In Elevation	41.52
Force Main Elevation	44
Lead/Lag Pumps "Off Elevation"	38.52
Lead Pump "On" Elevation	40.52
Lag Pump "On" and Alarm Elevation	41.02
Low Level Alarm Elevation	38.02
Volume Between Pump "On" and "Off", gal	2154
Q 10 pump run time (Volume/(Qout-Qin), min	6.0 >5 OK
Q 25 pump run time (Volume/(Qout-Qin), min	74.3 >5 OK

See attached sheet _____ of _____ for pump design conditions

EQUIVALENT LENGTH OF PIPE FOR FITTINGS 01/05/01

PIPE DIAMETER,INCH 12.00 Piping

TYPE	Le/D	QUANTITY	EQUIV. LENGTH (FEET)
PIPE LENGTH	-	160	160
GATE - FULLY OPEN	13	0	0
PLUG VALVE - FULLY OPEN	52	1	52
PLUG VALVE - FULLY OPEN	52	0	0
- 3/4 OPEN	140	0	0
- 1/2 OPEN	640	0	0
- 1/4 OPEN	3600	0	0
CHECK VALVE - SWING TYPE	135	1	135
CHECK VALVE - BALL TYPE	150	0	0
BUTTERFLY VALVE - FULLY OPEN	40	0	0
90 STANDARD ELBOW	30	2	60
90 LONG RADIUS ELBOW	20	0	0
90 STREET ELBOW	50	0	0
45 STANDARD ELBOW/INLET	16	3	48
45 STREET ELBOW	26	0	0
CLOSE RETURN BEND	50	0	0
STANDARD TEE - FLOW THROUGH	20	1	20
- FLOW THROUGH BRANCH	60	0	0
TOTAL EQUIVALENT LENGTH PIPE			475

STATIC HEAD	LWL	HWL
W.S. @ PUMP ELEVATION	38.52	40.52
DISCHARGE ELEVATION	60	60
STATIC HEAD	21.48	19.48

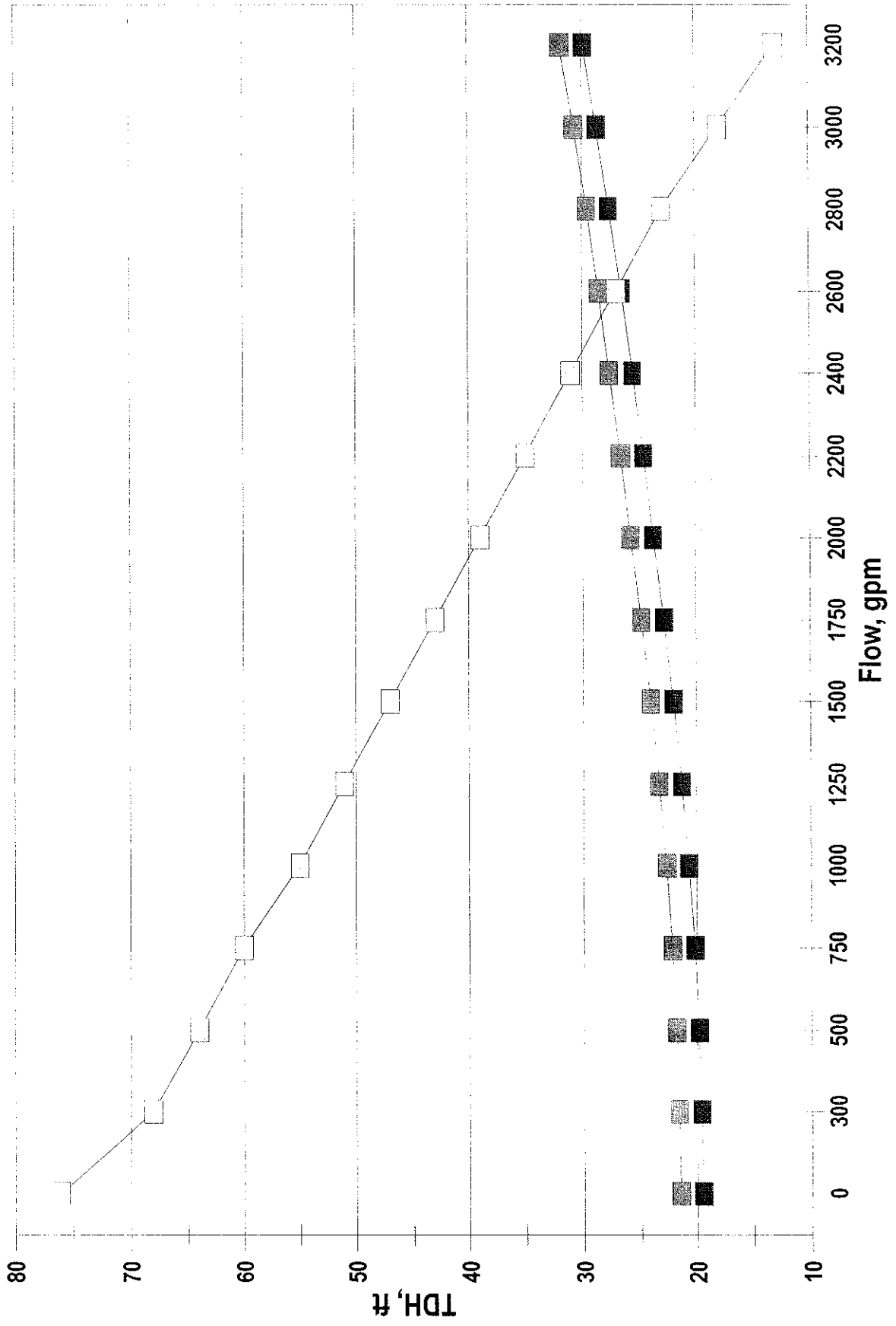
SYSTEM CURVE
FRICTION HEADLOSS AND TDH
HAZEN-WILLIAMS

$$HL\ FRIC = \frac{10.44 * LENGTH\ EQUIV. * Q\ EXP1.85}{DIAMETER\ EXP4.87 * C\ EXP1.88}$$

LENGTH EQIVALENT (FEET)	475
DIAMETER (INCHES)	12.00
C (FRICTION COEF.)	120

Q	C	LENGTH	DIAMETER	FRICTION LOSS	STATIC HEAD	TOTAL HEAD LOSS	TOTAL HEAD LOSS	VELOCITY	Q	ACTUAL PUMP CURVE DATA
0	120	475	12	0.00	21.48	21.5	19.5	0.0	0	76
300	120	475	12	0.13	21.48	21.6	19.6	0.9	300	68
500	120	475	12	0.33	21.48	21.8	19.8	1.4	500	64
750	120	475	12	0.71	21.48	22.2	20.2	2.1	750	60
1000	120	475	12	1.20	21.48	22.7	20.7	2.8	1000	55
1250	120	475	12	1.82	21.48	23.3	21.3	3.5	1250	51
1500	120	475	12	2.55	21.48	24.0	22.0	4.3	1500	47
1750	120	475	12	3.39	21.48	24.9	22.9	5.0	1750	43
2000	120	475	12	4.34	21.48	25.8	23.8	5.7	2000	39
2200	120	475	12	5.18	21.48	26.7	24.7	6.2	2200	35
2400	120	475	12	6.09	21.48	27.6	25.6	6.8	2400	31
2600	120	475	12	7.06	21.48	28.5	26.5	7.4	2600	27
2800	120	475	12	8.09	21.48	29.6	27.6	7.9	2800	23
3000	120	475	12	9.20	21.48	30.7	28.7	8.5	3000	18
3200	120	475	12	10.36	21.48	31.8	29.8	9.1	3200	13

Portland Jetport Parking Garage
Stormwater Pump Station Design

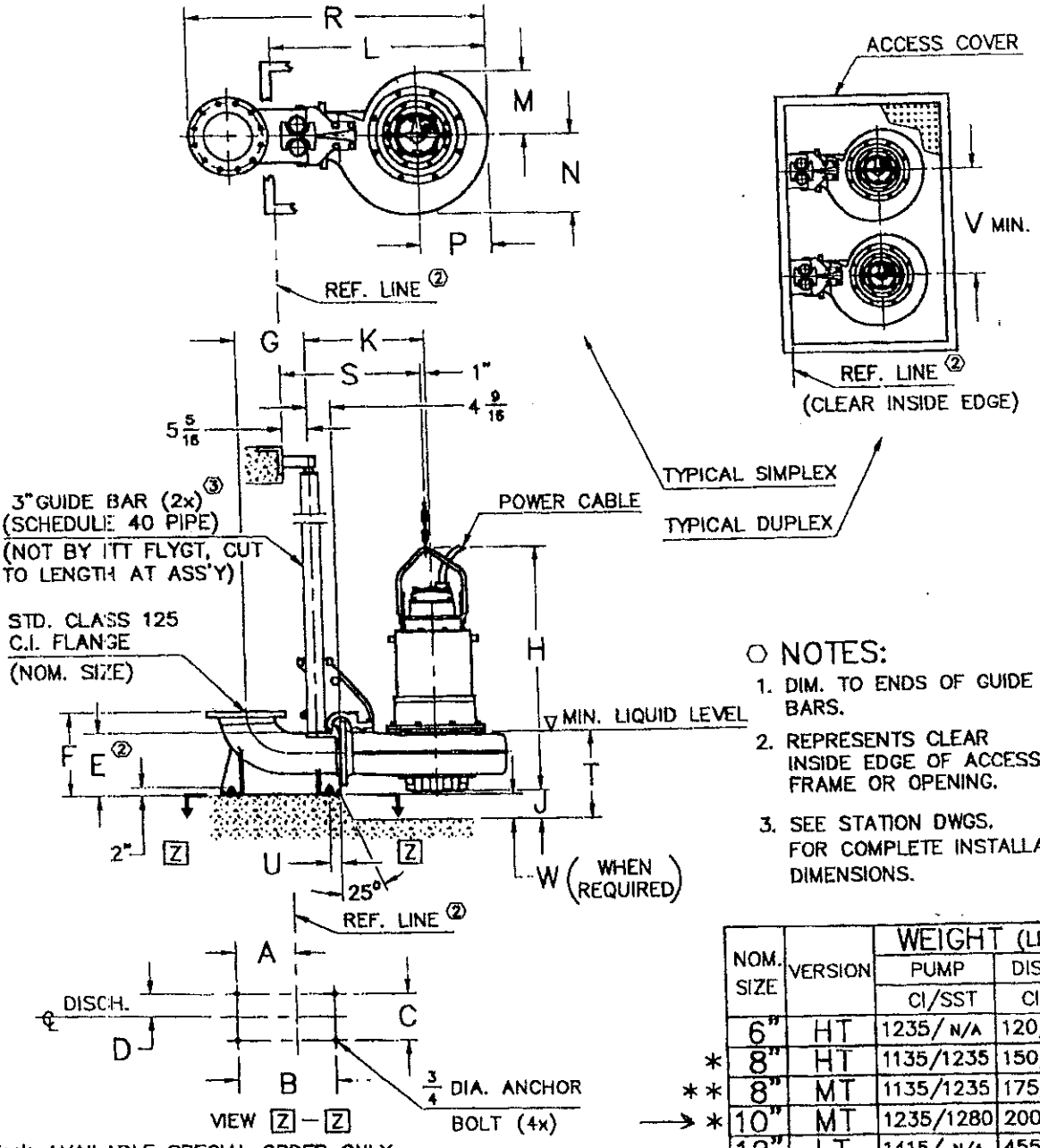


SHEET 4 OF 5

SECTION	PAGE
4	1
SUPERSEDES	ISSUED
6/94	3/96

SAME AS N/P

CP-3201
Outline Dimensions



○ NOTES:

1. DIM. TO ENDS OF GUIDE BARS.
2. REPRESENTS CLEAR INSIDE EDGE OF ACCESS FRAME OR OPENING.
3. SEE STATION DWGS. FOR COMPLETE INSTALLATION DIMENSIONS.

	NOM. SIZE	VERSION	WEIGHT (LBS) PUMP CI/SST	DISCH CI/SST
	6"	HT	1235/ N/A	120/ N/A
*	8"	HT	1135/1235	150/160
**	8"	MT	1135/1235	175/ N/A
→ *	10"	MT	1235/1280	200/225 ←
	12"	LT	1415/ N/A	455/ N/A
	14"	LT	1415/ N/A	465/ N/A

** AVAILABLE SPECIAL ORDER ONLY
* ALSO AVAILABLE IN STAINLESS STEEL
ALL DIMENSIONS IN INCHES

DIMENSIONAL CHART

	NOM. SIZE	VERSION	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W
	6"	HT	2 3/8	11	9 1/2	4 3/4	13	17 3/4	11	50	5 3/4	22 1/2	38	10 1/2	11	10 1/2	49 1/2	26 3/4	18	2 1/4	38	2
*	8"	HT	3 1/2	11	9 1/2	4 3/4	13 3/4	17 3/4	12 1/4	50	6 1/2	22 1/2	38	10 1/2	11	10 1/2	51 1/2	26 3/4	19	2 1/4	38	2
**	8"	MT	3 1/2	11	9 1/2	4 3/4	14 3/4	17 3/4	12 1/4	50 1/2	6 1/4	24 1/4	44 1/2	13	16 1/4	14 1/2	57 3/4	29	19	2 1/4	39	4
→ *	10"	MT	12 1/4	19 3/4	9 1/2	4 3/4	13 1/2	17 3/4	14 1/4	50 1/2	6	24 1/2	44	12 3/4	16 1/4	14 1/2	61	28 3/4	19	2 1/4	39	5 ←
	12"	LT	7 5/8	19 3/4	19 3/4	9 7/8	26 1/2	31 1/2	17	53 1/2	10 1/4	27 1/2	48 1/2	12 1/2	18 1/2	15 1/2	69 1/2	31 3/4	26	3	39	N/A
	14"	LT	7 5/8	19 3/4	19 3/4	9 7/8	26 1/2	33 1/2	18	53 1/2	10 1/4	27 1/2	48 1/2	12 1/2	18 1/2	15 1/2	71 1/2	31 3/4	26	3	39	N/A

SHEET 5 OF 5

PERFORMANCE CURVE

PRODUCT	NP3201.180
TYPE	MT
DATE	1999-06-29
PROJECT	
CURVE NO	63-643-00-6830
ISSUE	1

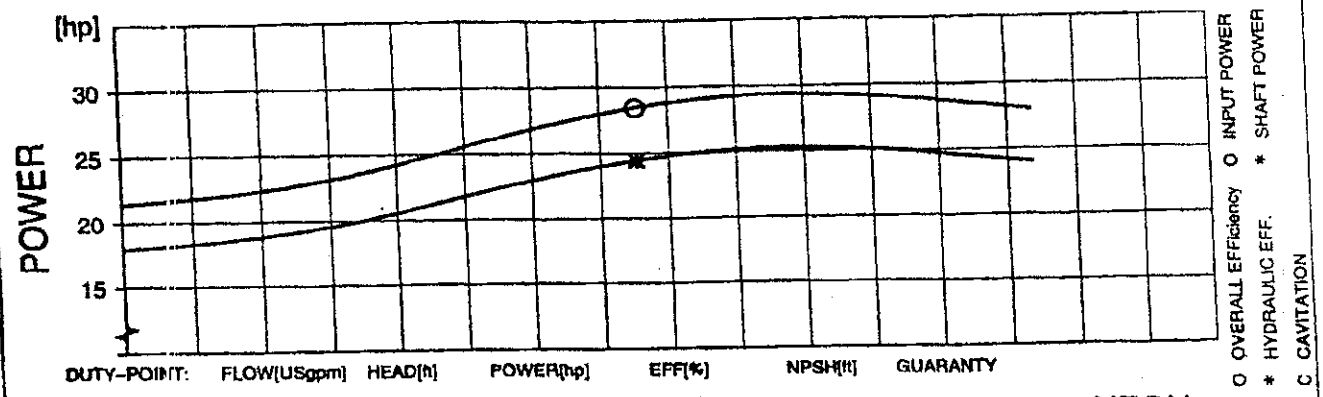
	1/1-LOAD	3/4-LOAD	1/2-LOAD
MOTOR COS PHI	0.81	0.75	0.64
MOTOR EFFICIENCY	86.5 %	86.0 %	83.5 %
GEAR EFFICIENCY	—	—	—

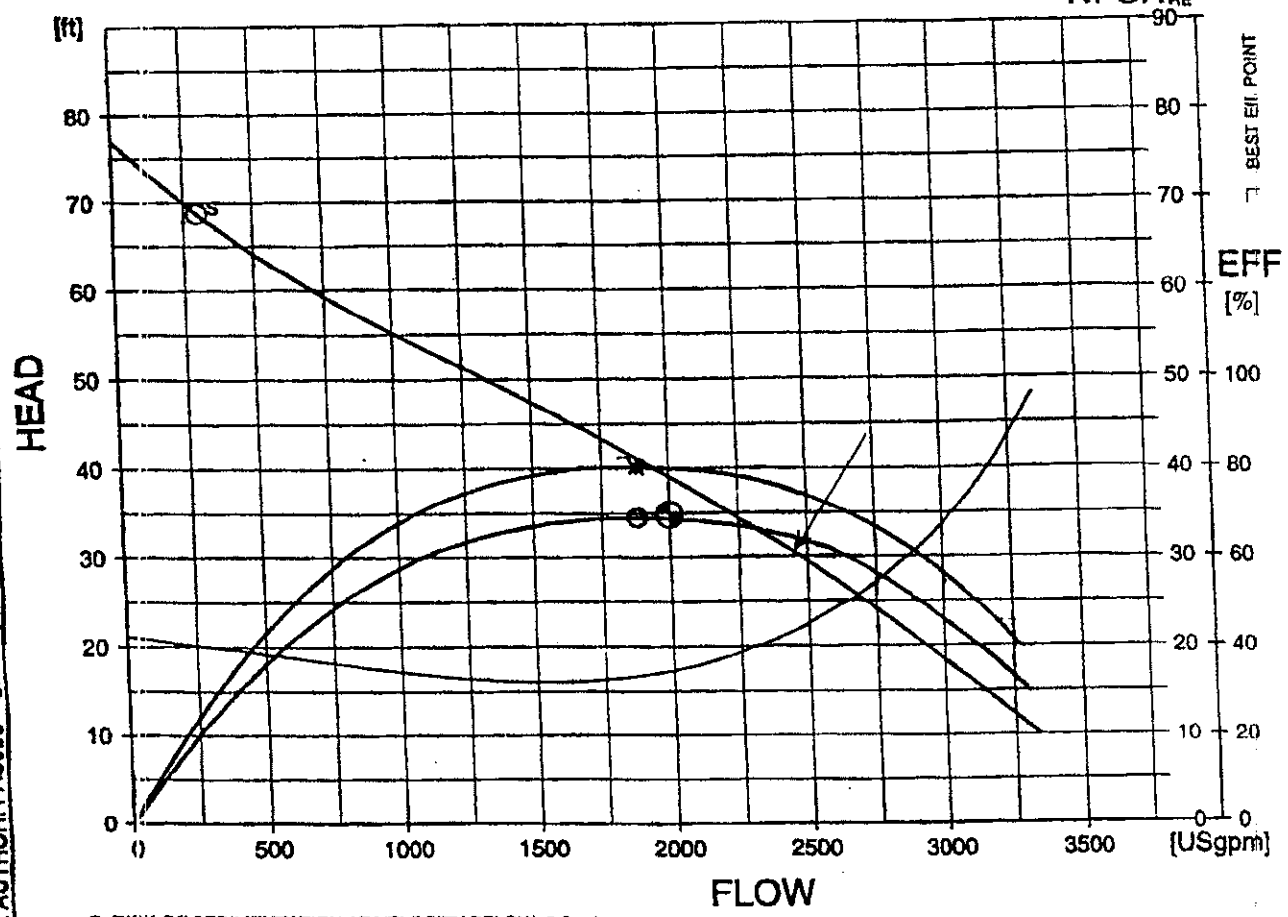
MOTOR SHAFT POWER	26 (35 hp)	kW
STARTING CURRENT ...	315	A
RATED CURRENT ...	47	A
RATED SPEED	1170	rpm
TOT.MOM.OF INERTIA ...	0.39	kgm2
NO. OF BLADES	2	

IMPELLER DIAMETER	320 mm
MOTORTYPE	27-26-6AA
STATOR	38D
REV	10
FREQ.	60 Hz
PHASES	3
VOLTAGE	460 V
POLES	6
GEARTYPE	—
RATIO	—

COMMENTS

INLET/OUTLET: 8" Volute





S: RISK OF SEDIMENTATION AT VELOCITY BELOW 0.8 m/s (STANDARD DIAM. 200 mm)

CURVES SHOW PERFORMANCE WITH CLEAR WATER

ISO CURVE

umlx AUTHOR: FA8050 SACU (rev5.7)

ATTACHMENT 14 - B

ALTERNATE GRAVITY DRAINAGE SYSTEM

SECTION 14 – B

STORMWATER MANAGEMENT
ATTACHMENT B – ALTERNATE GRAVITY DRAINAGE SYSTEM

Background Information

As discussed under the Section 14-A, Stormwater Pump Station Design, Dufresne-Henry is also exploring the possibility of a gravity stormwater drainage system to convey stormwater collected at the 1st floor level to a natural drainage basin located to the east of Taxiway C and north of Taxiway A. A conceptual alignment is shown on the attached exhibit. A preliminary review of the ground profile to the natural drainage basin shows that it is possible to discharge the stormwater collected to the natural drainage basin by gravity. The conceptual profile is attached.

In addition to conveying stormwater, this gravity system would also convey groundwater from below the garage as well. Alternately, four groundwater pump stations would be installed below the 1st floor level base slab each with a design capacity of 100 gpm based on discussions with the Geotechnical Engineer, Haley & Aldrich.

The drainage piping was preliminarily sized to accommodate the 25 year storm event from the same areas contributing to the stormwater pump station (See Sheet C1-54 "Stormwater Post Development Plan") and the estimated groundwater flow (approximately 1 cfs). Groundwater was estimated at 1 cfs (four 100 gpm groundwater pump stations). The total estimated design cfs (25 year storm plus groundwater flow) to be carried by the gravity storm drain is 6.3 cfs. An 18-inch stormdrain at a minimum slope of 0.003 has sufficient capacity to handle these flows based on the attached storm sewer sizing table.

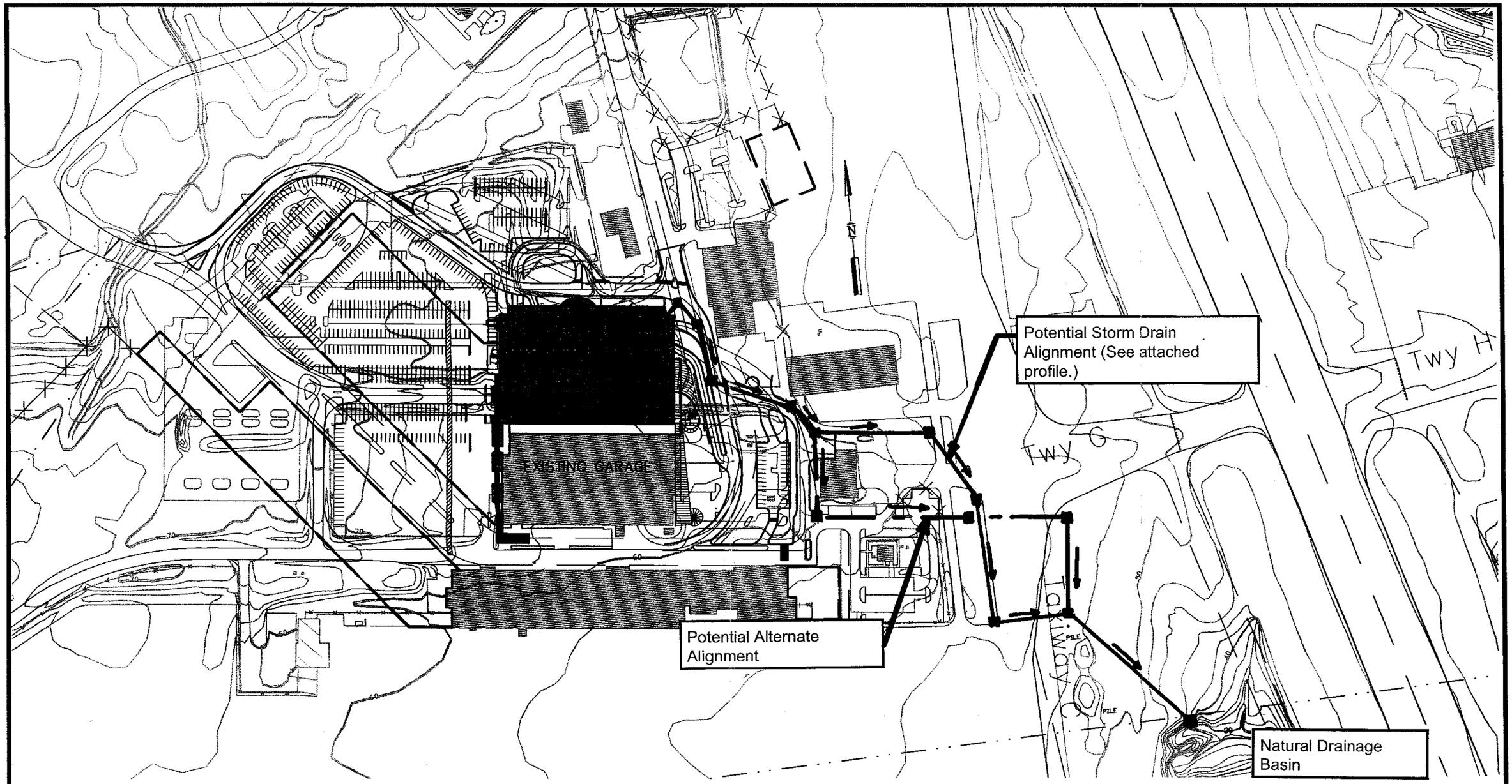
Portland Jetport Parking Garage
Storm Sewer Sizing

Manning's Equation: $Q = (1.486/n) \times A \times R^{(2/3)} \times S^{(1/2)}$

Q = Flow, cfs
n = Manning Coefficient
R = Hydraulic Radius
S = slope of hydraulic grade line, ft/ft
A = flow area, sf

HDPE or RCP STORM DRAIN PIPE

Pipe Size, inches	Slope, ft/ ft	n	A, sf	WP, ft	R, sf	V, ft/s	Q, cfs
4	0.003	0.011	0.09	1.05	0.08	1.41	0.12
6	0.003	0.011	0.20	1.57	0.13	1.85	0.36
8	0.003	0.011	0.35	2.09	0.17	2.24	0.78
10	0.003	0.011	0.55	2.62	0.21	2.60	1.42
12	0.003	0.011	0.79	3.14	0.25	2.94	2.31
15	0.003	0.011	1.23	3.93	0.31	3.41	4.18
18	0.003	0.011	1.77	4.71	0.38	3.85	6.80
21	0.003	0.011	2.41	5.50	0.44	4.26	10.26
24	0.003	0.011	3.14	6.28	0.50	4.66	14.64



PORTLAND INTERNATIONAL AIRPORT

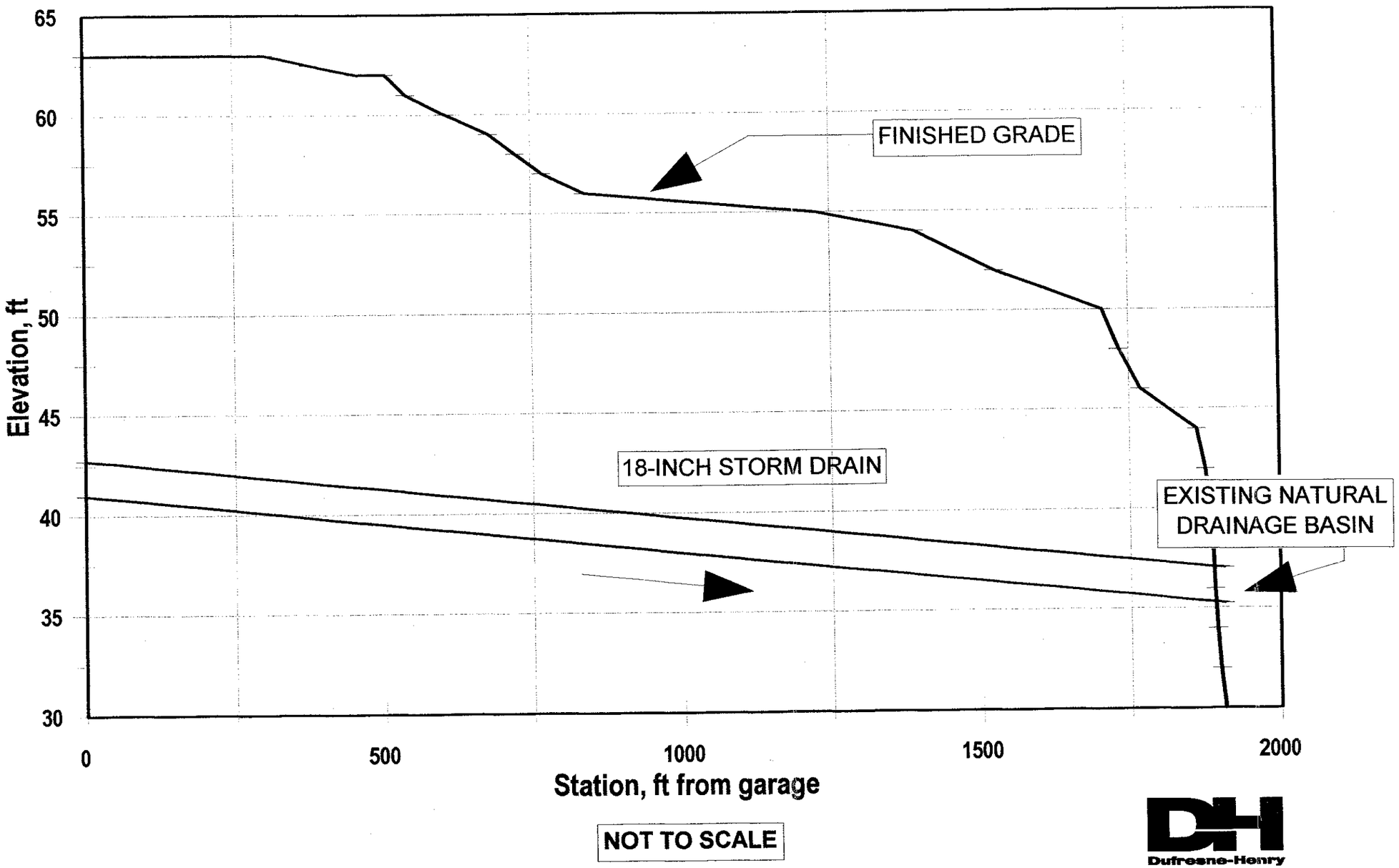
ALTERNATE STORMWATER DISCHARGE PLAN CONCEPTUAL ALIGNMENT

JANUARY 9, 2001

Dufresne-Henry

PORTLAND, ME

Portland Jetport Parking Garage
Gravity Storm Drain Profile



NOT TO SCALE

Dufresne-Henry

PORTLAND, ME